The Chemical Age

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The New South Sea Bubble

THE domestic affairs of Fleet Street are not as a rule of direct interest to our readers, but within the last few days the insurance mania has reached a crisis which has a certain importance, not only for the newspapers themselves, but especially for the manufacturers and traders of the country, who, as advertisers, are the people who really pay for the whole business. At the end of last week the London *Evening Standard* published a series of articles on Insurance by Newspapers, in which a well-informed writer described the scheme as a new South Sea Bubble, which must some day—and probably very soon—burst, and leave a nasty odour behind it. The trouble seems to be that the insurance companies who have hitherto accepted this business are no longer willing to renew their contracts; they are finding that claims are so heavy as to make the business unremunerative, while the vast quantities of bogus claims are involving them in a mass of work and trouble for which no provision has been made. If the newspapers cannot get the business underwritten, it will, of course, quickly come to an end. But apart from the troubles of the insurance world, advertisers are beginning to kick. As the *Evening Standard* points out, it is well known that advertisements form the life-blood of a newspaper's finance; and advertisement rates depend on the number of readers, not upon the number of policy collectors. Consequently, net sales are no longer a guide to advertising rates—and advertisers know it. Papers which have added millions to their sales by the simple device of a 1s. per annum premium to an insurance company are looking to the advertisers to pay for the added circulation, and advertisers are not unnaturally declining to do so. Complaints are more and more numerous; the time has come to speak out and to voice the disgust which a large section of the public is beginning to experience. One thing, at least, the public has a right to expect, and that is that the papers, now that the scheme is beginning to prove a burden rather than a blessing, shall pay up cheerfully and shall not hide behind their insurers. They have had a gay time—gay times have to be paid for.

Colloid Mill Developments

WE may, perhaps, be permitted to take some credit for the fact that the greater part of the literature which has appeared in this country in connection with the Plauson colloid mill is to be found in the columns of THE CHEMICAL AGE. At a comparatively early stage in its development it became evident to us that the colloid mill was predestined to play a prominent, if not a revolutionary, part in many industrial processes, and the interest which our readers have displayed in the matter is sufficient to indicate that the immense possibilities of Plauson's invention are at least beginning to be appreciated. More than one authoritative writer has contributed articles to our columns on the subject; but we are, perhaps, particularly fortunate in having secured the services of Dr. S. P. Schotz for the purpose of keeping us in close touch with the developments and new applications as they occur. Dr. Schotz, who is a personal friend of Dr. Plauson, speaks with an intimate knowledge of the now famous institute in Hamburg, and elsewhere in this issue he refers, among other things, to the work which has been carried out in connection with the production of plastic masses. A process has recently been patented in connection with the colloid mill which permits of the preparation of an almost unlimited variety of artificial masses, the method being based on the discovery that colloidised material of a suitable character can be used as a binder for the solids which are incorporated with it. For instance, such comparatively cheap materials as dried blood, waste yeast, and casein can be employed together with fillers, the quantity of the filler merely being limited by the mechanical strength demanded. Not only the colour but the flexibility, elasticity, and other properties of the finished article may be modified at will by varying the dispersion medium employed, or by reversing the functions of the various components.

Another highly interesting phase of the subject is that relating to the manufacture of superphosphates. Dr. Schotz deals in detail with the shortcomings of existing methods, and asserts that it is not necessary, according to recent observations made by Plauson, to convert phosphates into a soluble state before they can be absorbed by plants. If mineral phosphates, in fact, are transformed into colloids, or into a degree of dispersion approaching colloids, then the phosphates are readily attacked by the humic acids of the soil, and the resulting compounds are freely taken up by vegetation. On the whole, the developments foreshadowed by Dr. Schotz are of so striking a nature that they read, perhaps, like rather highly coloured romance. Those, however, who have any feeling of misgiving as to the claims made may be satisfied by the fact that they do not refer to mere theoretical conceptions but are put forward as a result of practical experience gained in that remarkable institute in Hamburg.

Recent Biochemical Progress

One valuable feature of the meetings last month of the British Association was the opportunity afforded for collecting together workers in different branches of science for joint discussion of their common problems. During the Hull meeting these combined sessions resulted in bringing together chemists and botanists to discuss photo-synthesis, while at the joint meeting of the agricultural and physiological sections the latest discoveries regarding vitamins were considered, several chemists again being present. The progress of science nowadays is such that the recognised boundary lines of a decade or two ago are gradually becoming obliterated, and overlapping frequently occurs. It is, therefore, desirable in the mutual interests of their respective sciences that workers viewing various aspects of the same subject should seize upon such opportunities for free discussion. These comments are inspired by the existence to-day of the bio-chemist—now bridging the gap between the chemist and the physiologist—who was unheard of less than a generation ago, and the subjects instanced above are within the province of biochemistry. This newly-separated science, young as it is, has already some notable achievements to its credit, and contributors to our columns have only recently described the latest developments in our knowledge of protein chemistry and of the accessory food factors. The results of other important investigations have recently been announced from the Biochemical Laboratory at Cambridge, where Professor Gowland Hopkins has isolated an interesting sulphur-containing constituent of the living animal cell which he has termed glutathione. It has hitherto been commonly assumed that the mechanism of the biochemical oxidations taking place in tissue-respirations was direct and quite simple in character; but it would now appear that, instead of a direct addition of oxygen, what actually takes place in the first instance is an addition of the elements of water and subsequent abstraction of hydrogen. According to Professor Hopkins, this reaction is accomplished by the intervention of glutathione, a dipeptide containing glutamic acid and cystein, and present in minute amounts (0·02 per cent.) in fresh tissues. Glutathione is auto-oxidisable in faintly alkaline solution on exposure to air; and when the reduced form of this body is changed to the oxidised condition two molecules are combined by the joining of two -HS groups to form a -S-S- grouping, the molecular weight of the latter compound being approximately twice that of the former. Thus, the substance to be oxidised in the cell is first hydrated, water being a necessary part of the reaction, when the oxidised form of glutathione (a hydrogen-acceptor) reacts with it, taking away hydrogen and leaving the cell-substance in an oxidised form. Meanwhile, the reduced glutathione so formed (a hydrogen-donator) is auto-oxidised by oxygen, and is then ready for further combustion work in the tissues. In all these reactions an atom of free oxygen is used up, as would be the case if the oxidation had taken place directly. The glutathione, therefore, assists the action of the tissue enzymes (catalysts) and is legitimately regarded as a co-enzyme. The chemical reactions occurring in the cell are thus being more clearly and accurately elucidated, for although the glutathione is present in low concentration it contains practically the whole of the organically combined non-protein sulphur of the cell, and there is evidence which suggests that this new substance has actual functions in the chemical dynamics of the cell.

Dean Inge and the Scientists

It is usually a salutary exercise for individuals or representative bodies to examine carefully what is said of them by the outsider. The candid critic has his uses, and frequently he puts his finger on some weak point that might be eliminated with advantage to all concerned; but when the man of science finds himself held up to the world as a pattern worthy of imitation he would be more than human were he not pleased with the compliment. The Dean of St. Paul's Cathedral, in a sermon preached at Hull during the meeting of the British Association, remarked that "the scientific temper is as great an asset to humanity as scientific discovery. Nowhere else do we find such disinterested devotion to truth, such unquenchable faith in the power and value of disciplined intellectual labour, such a bold sweep of imagination checked by such punctiliously accurate experiment. The air breathed by science is like that of the mountain heights—thin, but pure and bracing." It was a fine tribute; and when we remember the great names that have adorned the temples of science, and call to mind some of their achievements, we know that it was well-deserved. The researches in pure science that are being prosecuted with such enthusiasm in a thousand laboratories to-day are largely carried out by men of high ideals, with the single aim of attaining the truth. As has been well said, the scientific man rarely gathers to himself a superfluity of this world's goods; but he gets—what is far better—knowledge and understanding of the ways of nature. That "Science is its own reward" is still largely true, even in this practical age; but, as Huxley pointed out, what people call Applied Science is nothing but the application of pure science to particular classes of problems.

There are many grades of scientific workers, but they are connected by vital links. The pure chemists, for example, have for their object the enlargement of our knowledge of chemistry apart from any practical application of the observations made. In some senses these men are at opposite poles from those chemists whose aim is the application of known facts to practical problems; but the two classes of workers are complementary one to the other. All applied chemists must readily acknowledge the great debt which they owe to the pure chemist—the real pioneer—who has dug deeply before them into the mysteries, and has established important generalisations which have frequently served as jumping-off points for further discovery. The theoretically interesting discovery of to-day becomes the practically important fact of to-morrow, and this has over and over again been illustrated in the science of chemistry. To have called forth praise from Dean Inge is significant and encouraging, but it is essential for us to realise how important it is for the welfare of science that his words should continue to be applicable. Only by having worthy men in the forefront of our scientific endeavour can we make such progress in the practical matters of life as is essential for our continued prosperity as a nation and a race.

German Nitrogen Production

A LITTLE over a year ago the appalling explosion which destroyed the nitrogen works at Oppau seemed to point to a considerably decreased German output of nitrogen products for some time at least. A huge crater, 400 feet in diameter and 90 feet deep, was made by the explosion and the great works were, it was said at the time, literally wiped out. Yet, in the short space of twelve months, the site has not only been cleared and filled in, but a magnificent range of new factories has been erected, thus increasing the total output by 100,000 tons of nitrogen per annum. From this it would seem that Germany, despite the protests of her sympathisers that she is virtually ruined, is nevertheless rich enough to develop the manufacture of nitrogen on the grand scale. As M. Muraour points out in an article in *Chimie et Industrie*, since the war Germany has attained a capacity, in ammonia and cyanamide, of 500,000 tons of combined nitrogen per annum; and whereas she formerly imported 120,000 tons of nitrogen per annum in the form of Chile saltpetre, she can now transform about 12,000 tons of nitrogen into nitric acid and nitrates each year. The balance of 338,000 tons is something like 100,000 tons more than the joint pre-war production of Germany, Great Britain, the United States, France, Austro-Hungary, and Belgium. Owing to the rapid progress which is being made in the industry, it is confidently anticipated that an output of 400,000 tons will have been reached or even exceeded by the end of the present year, after which it is expected that the 500,000 tons standard will quickly be attained, thus leaving a large margin available for export. Even this huge figure does not appear to be regarded in Germany as a maximum, for additional new works, among which may be mentioned a proposed cyanamide plant at Pisteritz and a water-power project in the Bavarian Highlands, are already being planned. Thus, as Dr. Harker pointed out at the British Association meeting, Germany will be entirely independent of all importation, and, in the case of another war, will be assured of the basic materials for a gigantic production of munitions, together with enough fertiliser to enable her to grow a very large proportion of her food. The monopoly in cheap nitrogen which Germany is so vigorously creating bids fair to outmeasure her former monopoly in dyestuffs.

Points from Our News Pages

Mr. W. J. U. Woolcock, M.P., forms the subject of our eighth article on Leaders of Chemical Industry (p. 490).

Reviews are published of recent chemical books (p. 491).

Dr. S. P. Schotz contributes an interesting article dealing with the industrial applications of the Plauson colloid mill (p. 493).

The uses of tellurium are dealt with in an article by Mr. H. A. Doerner (p. 496).

Rubber as applied to aircraft formed the subject of a paper read by Mr. J. W. W. Dyer at a meeting of the Institution of Rubber Industry (p. 497).

Sir Ernest Benn, Bart., contributes an article in which he points out the effect of elections on trade (p. 499).

A cheerful feeling in some markets and very firm prices are recorded in our London Market Report (p. 505).

Our Scottish Market Report states that there was practically no change during the week (p. 507).

Books Received

CHEMISTRY OF PLANT PRODUCTS. Vol. II.—METABOLIC PROCESSES. By Paul Haas and T. G. Hill. London: Longmans, Green and Co. Pp. 140. 7s. 6d.

QUANTITATIVE CHEMICAL ANALYSIS. By A. C. Cumming and S. A. Kay. London: Gurney and Jackson. Pp. 432. 15s.

THE MANUFACTURE OF DYES. By J. C. Cain. London: Macmillan and Co., Ltd. Pp. 274. 12s. 6d.

THE NITROGEN INDUSTRY. By J. R. Partington and L. H. Parker. London: Constable and Co., Ltd. Pp. 336. 21s.

The Calendar

Oct. 9–15	International Congress on Liquid Fuels.	Paris
10	Institution of Petroleum Technologists "The Work of the Standardisation Committee." By Dr. A. E. Dunstan. 5.30 p.m.	Burlington House, Piccadilly, W.1.
11	Paint and Varnish Institute: Inaugural dinner	London.
12	The Optical Society: Papers by L. C. Martin and F. W. Preston. 7.30 p.m.	Imperial College of Science and Technology, South Kensington.
13	The Society of Dyers and Colourists (Manchester Section): Chairman's Inaugural Address on "The Dyeing and Finishing of Ramie." By Wm. Marshall, F.I.C. 7 p.m.	College of Technology, Manchester.
13	Society of Chemical Industry: Annual London Dinner. 7 p.m.	Connaught Rooms, Great Queen Street, Kingsway, W.C.2.
14	The Mining Institute of Scotland: General meeting.	Edinburgh.
16	Institution of Rubber Industry	Midland Hotel, Manchester.
16	The Faraday Society and the British Cold Storage and Ice Association. Joint Meeting to discuss "The Generation of Low Temperatures." 2.30 to 4, 4.45 to 6, and 7.45 to 10 p.m.	Institution of Electrical Engineers, Victoria Embankment, W.C.2.

Leaders of Chemical Industry

VIII.—Mr. W. J. U. Woolcock, C.B.E., M.P.

If a visitor from Japan or the United States or one of our overseas Dominions came on a mission of inquiry into the conditions of the British Chemical Industry he would irresistibly drift to a well-known address in Piccadilly, the headquarters of the Association of British Chemical Manufacturers. There he would be courteously shown into a handsome room, the interior decoration of which includes a gallery of original caricature-portraits presented by The Chemical Age. He would be welcomed by a tall, pleasant, self-possessed figure, with that indefinable endowment known as "presence" or "address," probably standing at ease in front of the fire, and greeting him familiarly like an old welcome friend. The visitor would find it hard at first to decide whether to place him in the legal or the parliamentary ranks, but on one point he would have no doubt. Within two minutes he would know that the purpose of his visit was understood intuitively, that he had come to the right place for information and counsel, that he had reached the real centre of the British chemical industry, and would go on his way informed and helped.

An Impression by "Spider"

The personality thus faintly sketched is none other than the General Manager of the Association, Mr. W. J. U. Woolcock, C.B.E., M.P.—William James Uglow Woolcock, to give him his full baptismal rank; member of the English Bar, Coalition-Liberal member for Central Hackney since 1918, at one time Parliamentary Private Secretary to the Ministry of Munitions and later holding a similar appointment to the Postmaster-General, past Secretary of the Pharmaceutical Society of Great Britain, Registrar under the Pharmacy Acts and a great many other things, all in varying degrees to his credit.

It is said that Dr. Charles Carpenter, when he was Chairman of the Association, "discovered" him, and he is considered not a bad judge of men. Mr. Woolcock, however, had already done something to facilitate the discovery by his valuable public work in connection with the Pharmaceutical Society, and particularly with the National Insurance Act. That was an anxious time for the pharmacists, and it may generally be said that what Cox did for the doctors Woolcock did for the pharmacists. His success in developing the work of the Society and in the negotiations relating to national insurance may be traced to one fundamental quality—his understanding of his fellow men. This is the indispensable virtue of the organiser and the diplomatist, the art of getting the best out of others. But in the present case it is reinforced by all the attendant virtues—a charming manner, a most persuasive gift of speech whether in the House, in the Board Room or at the dinner table, the instinct for seeing the line of least resistance and getting men of widely different views to unite in pursuing it, the gift, in short, of getting round or over or through difficulties with the least waste of energy and time.

If you can induce Mr. Woolcock to indulge in reminiscence he will probably tell you that up to about 21 years of age he had a very easy time. If you remark that since then he must have worked pretty hard to achieve the results that have come to pass, he will probably wave the compliment aside and say that it is all due to the splendid fellows he has had the good fortune to work with, and that all he has done is to get them to co-operate together. You politely agree, of course, but you know all the time where the unifying touch has come from, the happy inspiration which at the critical moment sees the right way out, the enthusiasm which keeps the work so pleasantly moving. And so you begin to understand why the centre of chemical industry, wherever it was before, is now located in Piccadilly, and the part which this cultivated and engaging personality has had in it.

Let us give a few facts to show that these casual generalisations are not without foundation:—

In 1899–1901 he was at the School of Pharmacy of the Pharmaceutical Society; from 1901–1910 at University College Hospital, and was then brought back to the Pharmaceutical Society to act as Secretary of the Committee which was producing the second British Pharmaceutical Codex. As soon as that work was finished he became organising secretary of the Society and in this capacity travelled all over England and Wales addressing meetings of members of the Society. In 1913 he was appointed Secretary and Registrar of the Society, which post he held until 1918. During the war the whole of the resources of the Society were placed at the disposal of the Government, and Mr. Woolcock's first task was to assist in seeing that the country's requirements of essential drugs and medicines were assured. When this task looked like being accomplished, he was secured by the War Office to deal with such medical supplies as were difficult to obtain.

On the advent of the present Lord Inverforth at the War Office as Surveyor-General of Supplies, he was appointed Assistant Director of Army Contracts and was responsible for the purchase of the enormous quantity of the medical requirements of the British Army and such medical supplies as the other Allied armies required from us. It is public knowledge how efficient and ample in quantity the medical and surgical equipments were during the war. Later, to relieve him from too much routine work, he was appointed Chairman of the War Office Committee V. (Medical Supplies), in which capacity he remained until the end of the war. A guidance of the disposal of the surplus medical stores was a fitting corollary to the task of obtaining them. In the meantime the Association of British Chemical Manufacturers had earmarked him for their special services.

The five years 1918–1923 have been fruitful in good work for British Chemical Industry, and the best comment on Mr. Woolcock's part in it is the fact that the Council have just entered into a new contract with him for another five years. What has been done already may be briefly sketched.

The Association was founded in 1916 and within two years was recognised as the responsible body of British chemical industry. To-day it has among its members all the important chemical firms in the country. Its business is done mainly through its various groups, representing "heavy" and "fine" chemicals; tar, intermediates, and dyestuffs; acids and alkalis, etc. Over all is a representative Council of the leaders of the various branches of the

industry and when that Council has given a decision on the sometimes necessarily divergent views of the various groups, the last word has been said as to the opinion of chemical industry on the point in question.

Affiliated to the Association are various special Associations dealing with particular branches of Chemical Industry, such as the National Sulphuric Acid Association, the Fertiliser Manufacturers' Association, the Association of Tar Distillers, and the British Chemical Plant Manufacturers. The last named is particularly attached to Mr. Woolcock as he succeeded in founding it only after a considerable effort. It is now a lusty infant and likely to form the connecting link between chemical plant makers and users to the benefit of both.

It is a commonplace to say that industry in this country has suffered considerably from the fact that our legislators have too often introduced and carried through Parliament legislation which has a considerable effect, sometimes adverse, on industry without being aware of it. It is part of the Association's work to watch the introduction of such bills very closely, and when necessary to see that the real effect of a measure which might prove inimical to chemical industry is thoroughly understood before such Bills become Acts of Parliament.

Mr. Woolcock was asked what he thought of the future work of the Association. "My friends," he replied, "regard me as an optimist, inclined to take the most cheerful view of things, but when I look at what has been done and the opportunities still before us I cannot help feeling optimistic. I believe, with good reason, that our natural chemical resources and our trained chemists are second to none, but we are a race of individualists at heart. It is at one and the same time the secret of our successes and our failures. The individualistic outlook is a wonderful factor in the progress of knowledge, but it is fatal in the world struggle to repair the material damage done to industry by war. By all means stimulate competition among the individual firms in an industry in order that new ideas, new plant, and new processes may be evolved, but having obtained the best ideas, plant, and processes, see that you stimulate the least efficient at the moment to rise to the level of the most efficient. There must be an exchange of ideas and a working together on behalf of the whole industry if the individual is to be successful. Members of any industry invariably think that there is more individualism in their own industry than in any other, and chemical manufacturers are no exception to the rule. My experience teaches me that in co-operative working and interdependence chemical manufacturers are rather better than most industrialists. They have certainly made great strides during the last few years, and I believe that membership of the Association has helped them to a large extent by encouraging the feeling that from the widest outlook it is the progress of the industry that matters. Individual prosperity follows as a matter of course

"Another factor which makes me an optimist is the gradual awakening of the general public to the national asset which it possesses in British chemical industry and in its scientific institutions. Perhaps I should reverse the order in which I mention these two in view of the recent newspaper controversy, but they are really of equal importance and neither can do without the other. It is enough that public recognition has come to both branches, 'pure' and 'applied,' and that further progress in the public estimation will depend on how closely the two branches will agree to work together."

On that note the conversation ended, and the writer left Mr. Woolcock feeling that optimism was contagious.

F. E. H.

Reviews

PATENTS FOR INVENTIONS. By J. EWART WALKER, B.A., and R. BRUCE FOSTER, B.Sc. London: Sir Isaac Pitman and Sons, Ltd. 1922. Pp. 377. 21s.

The object of this book is to set out the present law and practice relating to patents in a form which may be readily understood by inventors and firms interested in inventions from the point of view of their protection and commercial exploitation.

The first chapter gives a general review of the whole subject and states briefly and concisely the facts in regard to what may be patented, the legal rights, obligations and liabilities of the patentee, the Acts under which patents are granted and kept in force, the manner in which these Acts are administered, the privileges of the international convention by which priority of date can be claimed by an applicant for a patent in most foreign countries, the conditions under which applications for patents can be carried through by patent agents, the grant and sealing of letters patent, the opposition to the grant of a patent, fees for renewal of patents, and other details.

The second chapter describes in detail the steps to be adopted to obtain a patent, and the requirements of the Patent Office and how to meet them, particularly those requirements which may arise as a result of objections on the ground of insufficiency of description, more than one invention, anticipation by other inventors, post-dating of the application on the ground of insufficiency of description or disconformity of the complete and provisional specifications, etc. Another chapter describes the procedure in opposing the grant of a patent, the interpretation of the complete specification in regard to the scope of the protection covered by it, and the principles on which the Courts construe a specification if it come before them.

The considerations affecting the validity of a patent are given a separate chapter, and the various grounds on which validity may be challenged in the Courts are discussed at length—viz., that the patentee is not the true and first inventor, that the invention is not a "manner of manufacture," that it is contrary to public policy, is not novel or useful, is wanting in subject matter or inventive ingenuity, is not properly described in the specification, or that the complete specification is not in conformity with the provisional. The remaining chapters discuss fully and clearly the legal rights of the patentee in regard to infringement, royalties, transfer of rights, etc., and his liabilities in regard to revocation, grant of licences, etc

The latter half of the book is devoted to a reprint of the various Acts, Rules, and Regulations under which patents are granted and maintained, and also reprints of the various official forms which may be required to be lodged by a patentee. It may be doubted whether these reprints are worthy of the amount of space allotted to them, particularly as they are published by H.M. Stationery Office, and can be purchased for a few pence each. The inventors and firms for whom the book is primarily written would probably find its usefulness increased if some of this space were utilised for a fuller discussion of patent practice as illustrated by some of the leading decisions of the Courts which are to be found in the official Reports of Patent Cases. The principles of patent practice are set out in the book with admirable clearness, but the average non-legal mind finds that abstract principles are more easily understood if they are illustrated by concrete examples. A full index of these cases is given, however, and will be found of great value by those to whom the Reports are readily accessible. The book is admirably arranged with headings and sub-headings of different type so that any detail on which information is desired can be found at once.

F.

TESTED METHODS OF NON-FERROUS METALLURGICAL ANALYSIS. By Seymour Pile, M.A. (Cantab.), and Reginald Johnston, with a prefatory note by C. T. Heycock, F.R.S. London: H. F. and G. Witherby. Pp. 128. 7s. 6d.

This small volume is an important contribution to the bibliography of non-ferrous metallurgical analysis, since all the methods indicated therein have been carefully checked by the authors. The book abounds with practical information which will enable an analyst to make an unfamilar determination with the minimum amount of trouble.

Following the introduction, some very pertinent advice is given under "Obiter Dicta," and we would suggest that yet another might be added, viz.:—"There should be a place for everything and everything should be in its place." The work opens with some notes on "Analytical Procedure in General," and nearly three pages are devoted to "Sampling." The details of various assays are then stated in alphabetical order over 100 pages and, altogether, about 26 constituents are considered, including such elements as magnesium, tungsten, uranium and vanadium, while bearing metals are specially considered in a chapter of six pages. The concluding chapter deals with the preparation of special solutions used in this class of analytical work, such as alpha-nitroso-beta-naphthol, citric magnesia mixture and dimethyl-glyoxime.

As regards scope, the work is more or less restricted to the analyses of certain non-ferrous metals and alloys generally used for engineering purposes and, with the exception of silver, no mention is made of the precious metals.

As this book contains only methods which have been proved to be satisfactory, it should appeal strongly to the analyst, the teacher and the student. Much valuable time is frequently lost in laboratories by the selection of inaccurate methods or those where the practical details necessary for their success are omitted. The authors rightly claim that: "the outstanding feature of the book is the attention given to manipulative detail, and, particularly, to obtaining the element in a condition suitable for estimation." It should certainly find a place in every technical library. W. H. M.

THE PETROLEUM AND ALLIED INDUSTRIES. By James Kewley, London: Baillière, Tindall & Cox. Pp. 302. 12s. 6d.

This book forms one of the series of works on Industrial Chemistry edited by S. Rideal. In the preface the author expresses the hope that the book will appeal to the many employed in non-technical work in the petroleum industry, and to many University graduates to whom a knowledge of the outlines of an industry may be of assistance in determining their choice of a career. The work is likely to fulfil the hope thus expressed. It is difficult, in the space of a short review, to deal with a work which covers such a wide ground. A mere list of the part and section contents would fill several columns. The volume is divided into nine parts, and each part is divided into numerous sections; and there are few aspects of the petroleum industry which are not touched upon.

Not only each part, but each section is provided with references to the best of the modern literature, both in books and periodicals. As an example, Part I., called, "Introductory," deals in five sections with terminology, history, chemistry, geology, and theory of origin. Part II., on "Natural Gas," is divided into two sections. Part III., on "Crude Petroleum," into four sections: Part IV., on crude oils from shales and the like, into five sections: Part V., on bitumens, in two sections: Part VI., on the natural mineral waxes, in one section: Part VII., on the working up of crude oils, is in seven sections, and Part VIII., on the character and applications of petroleum products, is in seven sections. The final chapter deals with the testing of petroleum products. In addition to a very complete contents list, covering four pages, there are excellent subject and name indexes.

In spite of the wide range of subjects necessarily touched upon, the author has succeeded, by omitting every trace of needless verbiage, in giving a thoughtful and accurate presentation of his subjects, including much of the most recent work. The book is particularly free from errors, though on page 221 "perotlatum" should, of course, be "petrolatum." It might have been well to point out in Part VIII., Section "A," in the list of highest usable compressions on page 248, that the anti-detonating powers of the various bodies mentioned are not necessarily of the same order as the highest usable compression; for ethyl alcohol, in small quantities, is approximately half as efficient again as toluene as an anti-detonating material. Nevertheless, this section contains an excellent popularly written statement of the recent work by Ricardo and others on the influence of the physical properties of fuels on their utilisation in the modern high speed internal combustion engines.

In Part VIII., Section "B," the author points out (page 253) that all types of kerosenes behave well in vaporising lamps. For use in kerosene engines provided with vaporisers, however, there is a great difference in the behaviour of the various types of fuels. The Russian kerosenes are undoubtedly superior to the American kerosenes when used in paraffin engines.

On page 258 it is stated that tar oils have a lower ignition temperature than petroleum oils. This is obviously a slip, since from the context it is obvious that it should be "higher."

The work is even better than one would expect from the author, and that is saying a great deal. It has set a standard which it will be difficult for succeeding authors in the series to live up to. W. R. O.

The Nature of Acids

To the Editor of THE CHEMICAL AGE.

SIR,—I am greatly obliged to Professor Findlay and "Qualified Chemist" for their explanations, which make the whole thing perfectly clear.

The acid forms a hydrogen ion; the acidic character of the compound depends on the condition of everything except the hydrogen ion. In the case of inorganic acids the acidic character is due to the presence of an SO_2 group or something of that sort; in the case of organic acids the acidic character is due to the presence of a >CO group.

Moureu ought not to say the oxygen is the cause of acidity of an organic acid; he should have said the acidic character of an organic acid is due to the presence of a >CO group. It is erroneous to consider oxygen as the acidifying principle, but the existence of a >CO group is essential to the acidic character of an organic acid, and the introduction of oxygen into acid merely increases the acid properties and does not cause them. Considering what a long time ago he lived, there is perhaps some excuse for Lavoisier. I am inclined to think the classificatory statement regarding the constitution of substances which possess acid properties will be as useful for me to remember in future as the definition of an acid. I am afraid hitherto I have not clearly distinguished between "caused by" and "due to the presence of."

When an organic acid is combined in one body the acidic properties are due to the presence of the >CO; when it splits into two the acidic properties are caused by the hydrogen ion.—Yours, etc.,

October 3, 1922. STUDENT.

Industrial Applications of the Colloid Mill

By S. P. Schotz, D.Sc., F.I.C.

The articles dealing with Plauson's invention which have recently been appearing in our columns have attracted such widespread interest that we have arranged with Dr. Schotz to keep us informed of the more important technical developments which occur in connection with the colloid mill. This week we are giving a further article which discusses the possibilities of the mill in the varnish and other industries. In the near future Dr. Schotz will contribute, for the benefit of those readers who write stating that they are not familiar with the mechanical principles of Plauson's invention, a further article dealing with the construction of the mill.

THE application of the colloid mill in the varnish industry is sure to lead to considerable simplification and cheapening of manufacture. The new method claims the following advantages :—

(1) Does away with gum running.
(2) Allows almost unlimited choice of solvents for substances which hitherto required particular media.
(3) Admits application of new materials.
(4) Permits the use of fillers for specific purposes.

The finest varnishes are prepared from very hard gums. Copals and similar hard resins in their original state cannot be dissolved in common solvents. To make them soluble they have to be "run," *i.e.*, dry distilled in a suitable manner. "Gum running" demands much experience and skill. The material has first to be carefully graded, as gums of different origin require different temperatures and duration of heating for achieving the best consistency and solubility. It is often necessary to experiment in the laboratory to find the most favourable conditions. Only small lots, not more than 1 to 2 cwt., are worked at a time, and the losses are considerable. In the case of hard copals these may amount to 25 per cent., some of which is in the form of gas, the remainder being recovered as an oil of small value.

All these disadvantages and difficulties can be overcome by the colloid mill. To obtain a varnish all that is required is to grind the gum and chosen solvent in the mill till a colloidal solution is obtained. Copal varnishes prepared by this method possess, for obvious reasons, a superior toughness and, also, they are capable of a higher polish than varnishes prepared from the same gums by means of dry distillation. Naturally, the same procedure will be good in the case of other substances of importance in the varnish industry, where the difficulty consists not so much in the absence of a solvent as in the limited choice of suitable liquids or in the high price of those which are satisfactory, *e.g.*, to produce a varnish from "Bakelite" it is necessary to use alcohol and acetone, for cellulose esters—ether, ethyl and amyl alcohol are most useful. If we consider also that for some purposes it may be desirable to prepare a varnish containing two or more substances which are characterised by different solubilities, the troubles of the manufacturer become still greater. The concentration of a varnish, too, is frequently limited by its solubility. Colloidation by milling allows all materials to be treated in a uniform simple manner.

An example which well illustrates the uses of the colloid mill for production of varnishes is given in the patent, G.P. 227,955. Five to ten parts of ebonite powder are added to a solution of 100 parts of xylene and three parts of limonene, dipentene or turpentine. This mass is ground either at ordinary temperatures or, preferably, at 100°C. till a homogeneous liquid is obtained.

When applied this varnish gives a layer which on heating becomes as hard as ebonite. By using a mixture of ebonite and soft rubber a varnish yielding an elastic surface will result. The varnish can be further modified by replacing xylene with other solvents such as benzol, benzine and chlorinated hydrocarbons. It is evident that this new method of producing varnishes presents the widest scope for variation of these materials.

Filling Materials

A further application of colloids to the varnish industry is found in the use of colloidal fillers. Almost any substance which lends itself to colloidal dispersion can be utilised to this end. By the introduction of colloidal colouring matter into colloid varnishes beautiful colour effects can be obtained. By the addition of colloidal mica to a varnish the latter acquires high insulating power. A varnish which is particularly suitable for this purpose has been prepared by Ditmar from cellon-rubber.* Cellon-rubber is produced in the following manner :—Celluloid and non-vulcanised rubber are separately treated with cyclohexanol in a mixing and pugging machine till dissolved, and these solutions are then worked together till a uniform mass is obtained. Cellon-rubber varnishes containing colloidal mica have been found to possess great flexibility, elasticity and immunity from cracking. They have been applied to copper and iron wires with excellent results.

Colloidal Paints

In the manufacture of paints, colloid mill treatment has resulted in progress in several directions. Many natural and artificial pigments are not definite chemical compounds, but consist either of mixtures of a similar general character or of distinct combinations containing a small proportion of impurities of a nature totally different from the chief component. An average ultramarine will belong to the first class, a common barytes to the second class. By the ordinary chemical and physical methods which are available it is not possible to separate or purify these compounds in a satisfactory and, at the same time, inexpensive manner.

In the case of ultramarine, even when all conditions of the manufacturing process have been carefully observed, proper grading of the various batches has to be carried out. With natural pigments, such as ochre, suitable blending is just as important, or an inferior material has to be put on the market. By selective colloidation in the mill it is possible to purify inferior pigments. One either colloidises the pigment or its impurities and so separates them. Sometimes it is more convenient to colloidise the mixture and then to precipitate one of its components.

Fineness of Division

Almost any pigment used in the manufacture of paints greatly increases in value through being ground in the colloid mill. The beauty of a pigment depends to a great extent on the minute division of its composite particles. The smaller these are the more beautiful in appearance is the pigment. It follows that converting a pigment into particles of colloidal dimensions must be very beneficial to its quality. Colloidation is usually accompanied by a brightening and improvement of the tint of the colour. Ultramarine, ochre, and lamp black assume a velvety lustre. Colloidal red lead gives the effect of vermilion.

Although the introduction of these methods into paint technology is to the credit of Plauson, the underlying ideas are very ancient. The wonderful paintings which form the heritage of the Middle Ages owe a great deal to the

* *Chemiker Zeitung*, 1921, No. 102.

fineness of the colours employed by the brilliant masters who created them. This was accomplished by grinding paints by hand for weeks on end. It has now been found that by this mode of treatment a portion of the pigment is converted into the colloidal state. Another case is that of the, so-called, Indian ink which has been manufactured in China for centuries. Finely divided carbon is first obtained by properly regulated combustion. This material is then subjected to such a thorough grinding by hand as only the patient Chinese are capable of. During this procedure a portion of the carbon becomes colloidised.

Covering Power

For every colouring material there exists a thickness, which at ordinary illumination shows the actual tone of the colour independently of the hue of an opaque surface to which it is applied. Let us call this thickness the opacity constant of the pigment. If we use a coarse pigment then in order to cover a surface, the particles of the colouring material will in most places be multiples of the opacity constant of the pigment. The covering power of materials possessing the same opacity constant is inversely proportional to the diameter of their particles. Now suppose we have ground a pigment very finely, it is clear then that we are able to make an opaque covering on the same surface with less material.

This idea can be illustrated by means of the following example. Two lamp blacks (I) and (II) gave on analysis the following figures :—

Size of Particles.	I.	II.
400 to 1,000 μ (average 700 μ)	6·7%	0
45 to 400 μ (average 222·5 μ)	17·2%	0
4·8 to 45 μ (average 24·9 μ)	43·2%	0
1 to 4·8 μ	20·2%	3·1%
0·01 to 1 μ	12·7%	96%

μ = 0·001 mm.

Suppose 4·8 μ is the opacity constant of these lamp blacks and that we have converted them into paints and diluted these so as to give a perfect covering for the largest possible surface then the ratio of surfaces covered by unit weights of (I) and (II) will be as

$$\left(\frac{6\cdot7\times4\cdot8}{700}+\frac{17\cdot2\times4\cdot8}{222\cdot5}+\frac{43\cdot2\times4\cdot8}{24\cdot9}+20\cdot2+12\cdot7\right)$$

is to $(3\cdot1+96)$

or as 41·6 is to 99·1

If lamp black (I) could be reduced to the fineness of lamp black (II) then according to these calculations the increase of covering power would be equal to 138 per cent. This can, of course, be effected by passing lamp black (I) mixed with water through the colloid mill. In practice colloidal paint can be diluted with suitable solvents to a minimum strength and in this manner the increased covering ability turned to good account.

Another characteristic of colloidal pigments is their power to penetrate all crevices. Therefore, they afford superior protection. Of other valuable properties inherent to these materials it may be pointed out that they can be sprayed by means of an atomiser thus resulting in considerable saving of time and labour.

Synthetic Masses

Modern technical development has brought about a demand for synthetic masses which possess good tensile strength, lightness, high insulating power, low conductivity for heat and resistance to the effects of water, moderate temperatures, and bacterial life. This applies to the electrical, motoring, and gramophone industries, and to domestic arts. It is obvious that substances having particular distinguishing qualities, may frequently be required.

In THE CHEMICAL AGE for June 17 a method for the production of plastic masses from cellulose was described. A further process has been patented in connection with the Colloid Mill, which permits the preparation of an almost unlimited variety of artificial masses.*

It is based on the discovery that colloidised material of a suitable character can be used as binder for solids which are incorporated in it. Such cheap materials as dried blood, hæmoglobin, waste yeast, casein and other protein matter can be employed together with fillers, the quantity of which is merely limited by the mechanical strength which is aimed at. Perhaps it will be best to explain the method by giving one or two typical examples :—

One hundred parts of a 35 to 50 per cent. aqueous solution of hæmoglobin are heated with 40 to 60 parts of phenol until, after an initial coagulation, liquifaction takes place. Forty to sixty parts of 40 per cent. formaldehyde are then added, and the mixture is worked in the Colloid Mill until it becomes homogeneous. It smells now of formaldehyde and phenol. With each 50 parts of this colloidal solution 70 parts of dried blood or hæmoglobin are mixed, the mass well dried and finally pressed into shape in moulds heated to 80–125° C. Such articles are completely devoid of smell, extremely hard and strong, and capable of taking a high polish. As may be expected, the materials produced by this method are dark in colour, but light coloured articles can be obtained if the plastic masses are dissolved in alkali, freed from impurities, and reprecipitated with acid. By adding heavy spar, kaolin, and talcum, beautiful ivory-like tones can be obtained.

In the foregoing example the dispersion medium was water; dichlorhydrin and other polyhydric aliphatic alcohols have, however, been found to be the best media for this purpose. The alcohols can be diluted with chlorinated hydrocarbon. To get best results the raw material, such as blood, is first treated with formaldehyde or some tanning agent, evaporated to dryness, then subjected to Colloid Mill treatment in a dichlorhydrin medium as described, the solvent being recovered by vacuum distillation at a temperature not exceeding 50° C. Like all Colloid Mill processes these can be varied in manifold directions—*e.g.*, we may take mixtures of proteins as a binder, or utilise one of them as a binder and the other as a filler, or reverse the functions of the various components. If a material of a high insulating power is required, then colloidal or partially colloidised mica is added. The flexibility, elasticity, and other properties of these materials can be similarly modified by admixture of suitable substances.

Manufacture of Superphosphates

The manufacture of superphosphates consists essentially in treating finely milled tribasic phosphate of lime or complex phosphatic minerals with sulphuric acid and regrinding the soluble acid calcium phosphate which is thus formed. Superphosphates are easily absorbed by plants, which in this way are able to obtain the phosphorus requisite for their growth if the soil is poor in this element.

The outlined process suffers from important economical and technical shortcomings :—

(1) Large quantities of sulphuric acid are necessary. Thus, to consider the simplest case :—

$$Ca_3(PO_4)_2+2H_2SO_4=CaH_4(PO_4)_2+2CaSO_4$$

according to which equation 100 parts of pure calcium phosphate require 63·2 parts of 100 per cent. sulphuric acid. If we work out similarly the reactions of calcium carbonate, chloride and fluoride with sulphuric acid, we find that 100 parts of these correspond to 98, 88·3 and 125·5 parts respectively of sulphuric acid. In consequence, natural phosphates containing a large percentage of these

* English Patent 176,035.

compounds may necessitate even more acid than calcium phosphate.

(2) Phosphates associated with calcium chloride and fluoride give with oil of vitriol very obnoxious fumes, containing hydrochloric and hydrofluoric acid and other toxic gases. These must not be allowed to escape into the atmosphere, not only because it is illegal but also on account of injury which would be caused to the health of workers, to factory buildings, and to machinery. The gases are, therefore, drawn by means of powerful indestructible fans, through complicated gas scrubbers containing water, wherein the corrosive components are absorbed. As the necessary plant is expensive to install and maintain, ventilation and purification alone introduces considerable expense.

(3) The superphosphate is allowed to solidify in dens. The hard blocks are difficult to manipulate; they must be broken up and the material again ground before it is ready for use. All this entails much labour and power.

(4) The process is dangerous and unhealthy.

According to observations by Plauson it is not necessary to convert the phosphates into a soluble state before they can be absorbed by plants. If mineral phosphates are transformed into colloids or into a degree of dispersion approaching colloids, then the fine phosphates are easily attacked by the humic acids of the soil. The resulting compounds are freely taken up by vegetation.

The facility with which these substances, barely combining at ordinary temperatures, react in the colloidal state, is merely one of a number of similar reactions which have been observed not only by investigators who follow Plauson's ideas but also by scientists who have employed the orthodox methods of colloid chemistry. To mention one instance: Colloidal silver reacts easily with colloidal sulphur forming colloidal silver sulphide.*

The colloidation of phosphates is carried out in the presence of small quantities of acid or alkali which assist the breaking down of the larger aggregates. As described in English Patent No. 156,124 the process is as follows:—

One hundred parts of slag phosphate are disintegrated in the Colloid Mill in presence of six hundred parts of water. The mechanical effect is enhanced by heating the material or by pressure. The colloidal solution is precipitated by treatment with acid, the finely divided phosphate being collected and dried.

From this brief description the advantages of the new method are apparent:—

(1) According to Plauson only 1 to 3 per cent. of acid are necessary to assist the colloidation—*i.e.*, 1½ to 5 per cent. of the sulphuric acid which would be needed for formation of superphosphates.

(2) As all the work is carried out in aqueous solution no harmful gases are evolved, and, therefore, the scrubbing plant is no longer wanted.

(3) There is no necessity for dens. The machinery for digging the superphosphate from dens is also dispensed with. All grinding is conducted in one continuous operation.

(4) The manufacture is free from dangers and perfectly sanitary.

(5) The manufacture of colloidal calcium phosphate is a simple procedure which is quite independent of variations in the nature and quality of materials and demands a minimum of skilled labour and supervision.

The advantages of colloidal phosphates from the farmers point of view are obvious. They are simple to store, can be applied indiscriminately and mixed with any other kind of natural or artificial manure.

* *Freundlich and Nathansohn, Kolloid Zeitschr.*, 28, 16, 1921.

German Gas Mantles

Committee favour an Import Duty

THE committee appointed under the Safeguarding of Industries Act to inquire into a complaint by the Incandescent Mantle Manufacturers' Association with respect to incandescent gas mantles manufactured in Germany and imported into this country, have reported in favour of the application to these imports of the section of the Act which authorises the imposition of a duty of 33⅓ per cent. In their conclusions the committee state:

(1) We are in the main satisfied that the bulk of the German mantles which are imported into this country are sold to dealers at the prices fixed by the Convention of German Mantle Manufacturers.

(2) This price is very much above German manufacturing costs, very considerably lower than the costs of manufacture of the principal British manufacturers, and distinctly lower than the lowest prices of British mantles quoted by the opponents as an indication of the real minimum cost of manufacture in this country. We find that the difference between the costs put before us by the principal manufacturers and the price of the German goods is so large as not to be substantially affected by any qualification we may make with regard to the former.

(3) We are of opinion that this capacity to undersell is principally due to the advantage which the Germans derive from their low costs in respect of labour, salaries, and other overhead charges, when reckoned in sterling, for the reason that these charges have not increased in proportion to the decrease in the exchange value of the currency. This advantage is not offset to any appreciable extent by any necessity to purchase raw materials abroad.

(4) We are of opinion that, in view of the progressive rise in German imports, coincident with a decline from other sources, and in view particularly of the wide margin between German domestic wholesale prices, and the Convention selling price in Great Britain, these imports have, and are likely to have, a serious effect upon employment in the home gas mantle trade.

(5) We are not convinced that the imposition of a duty on gas mantles would have any appreciable effect on employment in the gas industry, which is the only industry which, we think, could possibly be considered as using mantles as material.

(6) We are of opinion that the gas mantle industry is overcapitalised, and that this fact must tell against full economy in cost control, but that as regards processes of manufacture and use of materials, it is up to date and efficiently conducted.

Distinctive Colours for Poisons

Experiments with Various Colouring Substances

AT the request of the Privy Council, who are responsible for the Poisons and Pharmacy Act, a series of experiments is now being carried out by the Pharmaceutical Society of Great Britain to test the feasibility of the proposal made by several High Court judges that poisons should be given distinctive colours.

In the opinion of the investigators, the danger from poison would be increased rather than reduced if the poison when coloured did not remain practically the same shade under all conditions. They are therefore seeking, as a first essential, stability of colour. In the second place, they are rejecting all colouring substances that might interfere with delicate analytical tests and so prevent the identification of poison by analysis.

The practicability of the proposal from the point of view of colour-makers was discussed in an interview by Dr. A. T. de Mouilpied, of the British Dyestuffs Corporation, Ltd. Already, he pointed out, there is a Government regulation that methylated spirit should be coloured with an aniline dye. The effect has been, in the first place, to make the drinking of methylated spirit more difficult, and, secondly, to standardise the article itself. Nowadays a person buying methylated spirit does not try it or smell it, he merely looks at it. So in time it would be with arsenic and strychnine and cyanides, had each of them its particular tinge.

Colouring materials, he continued, are now freely used in foods, and the whole of the sweetstuffs trade makes large use of dyestuffs to colour boiled sweets, creams, &c

The Uses of Tellurium

By H. A. Doerner (U.S.A. Bureau of Mines)

Historical.—Tellurium is usually associated with the more common element, selenium. Both of these elements are similar in many ways to sulphur. Small quantities of tellurium in the free state were found by early mineralogists, who on account of its metallic lustre named it metallum problematum. Native tellurium was examined by Müller von Rechenstein in 1782, and at his suggestion Klaproth, in 1798, made a study of the tellurium ores and found they contained a metal-like substance. He called this tellurium from "tellus," the earth. Berzelius studied tellurium exhaustively in 1832. From its chemical nature, tellurium is now known to be a non-metallic element, belonging to the sulphur-oxygen group. Tellurium is most popularly known through its occurrence in certain gold ores—tellurides—which have been extensively mined in the Cripple Creek mining district, Colorado.

Properties of Tellurium.—Tellurium is a silver white solid with metallic lustre, the crystalline form being very brittle and easily powdered. It has a specific gravity of 6·27, melts at 452° C., and boils at red heat, giving off a golden-yellow vapour when air is excluded. When heated in air, tellurium burns with a blue flame tinged with green, and evolves white vapours of tellurium dioxide. An amorphous form of tellurium, obtained by reduction and precipitation from solution, has a specific gravity of 6·015, and when heated is changed to the crystalline variety. Tellurium is insoluble in water, carbon disilphide, or hydrochloric acids, but it is dissolved by nitric or concentrated sulphuric acid. It does not tarnish in moist air, is resistant to alkaline solutions, except concentrated KOH, but it is dissolved by fused alkalis. Its atomic weight has been the subject of much controversy, but the value 127·5 has been generally accepted. The chemistry of tellurium is similar to that of sulphur. It forms three oxides: TeO, TeO_2, and TeO_3; also tellurides, tellurites, and tellurates. A number of halide compounds, a sulphide, and a sulphate are known.

Sources of Tellurium.—Tellurium occurs in the free state, but usually it is chemically combined as metallic tellurides or tellurates, a fairly common mineral being tetradymite, Bi_2Te_3. Other tellurium-bearing minerals are allaite, PbTe; coloradolite, HgTe; calaverite, AuTe; sylvanite, $AuAgTe_4$; and petzite, Au_3AgTe_2. Most gold and silver ores and particularly copper ores contain tellurium. In the course of smelting and refining these ores, tellurium is found in concentrated form in the flue dust of smelters, electrolytic slimes, and in the fumes and slags resulting from cupellation. The whole commercial supply of the element is obtained as a by-product from copper ores. Pyrite and sulphur, used in the manufacture of sulphuric acid, also contain tellurium as it is found in the fine dust and acid sludge of acid plants. Tellurium minerals are found in Transylvania, Hungary, Spain, Brazil, Bolivia, Chili, Mexico, Japan, Australia, California, Colorado, and Virginia.

Samples of tellurium for research purposes may be obtained from the Committee on the Uses of Selenium and Tellurium, National Research Council, Washington, D.C.

Present Uses.—The present uses for tellurium are very limited, the demand being supplied by a few hundred pounds per year. Efforts have been made by Government agencies in co-operation with copper refiners to discover new uses for tellurium, but no important results have been reported. It has been used in a small way in high-resistance and other alloys, in organic dyes, for staining silver, in medicine, and as a reagent in chemical laboratories. As a colouring agent in glass or porcelain, blue, brown, and red colours may be produced by tellurium, some of the best ceramics being coloured in this way. (*Chemiker-Zeitung*, vol. 38, 1914, p. 873.) Tellurium dissolved in sodium sulphide solution is used in toning baths for photographic prints. Tellurium dioxide at red heat is a powerful oxidising agent, decomposing completely even lumps of steel or metal alloys. Its chemical similarity to sulphur suggests many possible uses. It might be used, for instance, as telluride in colouring lithophone, and the extension of the use of tellurium might well be studied in connection with the iron and steel industry. There is undoubted promise in experimentation with tellurium compounds in the field of organic medicinals, while their physiological action in derivatives similar to those of sulphur and selenium has not yet been developed. In compounds similar to selenium oxychloride, tellurium may provide valuable laboratory reagents.

The use of 2/10 of 1 per cent. diethyl telluride in gasoline as an anti-knock compound has been reliably reported. It is said to eliminate carbon deposits and to produce greatly increased efficiency when used in motors designed to operate on very high compression. A special type of engine is said to be required to produce these results, hence its general use in motors will not be feasible unless the motor industry should conform to the required type. This step in turn would be dependent on a supply of tellurium adequate to treat all the motor fuel. For this purpose, 1,500 tons of tellurium per year would be required, and as the possible annual supply of tellurium from the present best known sources of copper refineries is said to be only about 125,000 pounds, a much larger supply must be developed; the discovery of new uses not dependent on so large a supply would result in wider utilisation of present resources.

Metallurgy of Tellurium.—Tellurium is usually offered in the impure state, and no market standards have been developed. No ores are known that are rich enough in tellurium to permit mining and treatment for tellurium alone, even if the demand increased to large proportions. It is probable that the future supply will be derived as a by-product from metallurgical processes as in the past. The present practice for recovering tellurium from the residues in copper refining is well presented by Lawrence Addicks in a 1921 publication, *Copper Refining*. Briefly, the hot, alkaline solution obtained by leaching slag from the Dor furnace is acidified with sulphuric acid and agitated by air. Commercially pure tellurium is precipitated and recovered by filtration. Another method is described by Oberhelman and Browning, in the American *Journal of Science* (vol. 36, p. 399).

Qualitative Tests.—Tellurium may be detected in a mineral by the following methods:—

1. For native tellurium and tellurides, heat a little of the finely pulverised substance in a test tube with about 5 c.c. concentrated sulphuric acid, when the latter will assume a beautiful reddish-violet colour if tellurium is present.

2. For the presence of tellurium in minerals in general, dissolve the pulverised substance in nitric acid or aqua regia and evaporate the solution to dryness with hydrochloric acid. Repeat this procedure and finally take up the residue with dilute hydrochloric acid; filter, and pass SO_2 through the filtrate, when tellurium will be precipitated as a black metallic-looking powder. This powder may be filtered off and treated as under paragraph 1.

Quantitative Estimation.—The quantitative estimation of tellurium has been up to the present time of limited importance. The Committee on Selenium and Tellurium of the National Research Council, Washington, D.C., has been for some time studying the analytical chemistry of selenium and tellurium. The results of the investigation will be given to the public in the near future. The methods given in Treadwell-Hall's *Quantitative Analysis*, published by Wiley and Sons, are probably as satisfactory as any now published. A gravimetric method by Lenher and Homberger was published in *The Journal of the American Chemical Society* (vol. 30, pp. 387-391).

Chemistry of Tellurium.—The details of the chemistry of tellurium do not come within the scope of this paper, but they may be obtained from Thorp's *Chemical Dictionary*, or from Roscoe and Schorlemmer's *Treatises on Chemistry*. Useful papers entitled, *A Study of Tellurites*, by Lenher and Wolensky, and *A Study in Tellurides*, by Chas. A. Tibbals are printed in *The Journal of the American Chemical Society* (vols. 31 and 35). In the *American Journal of Science* (vol. 36), are excellent papers on telluric acid, by Browning and Minning, and tellurous acid, by Oberhelman and Browning.

General information concerning tellurium may be obtained from the annual publications: *Mineral Resources of the United States*, by the U.S. Geological Survey, and from *Mineral Industry*, published by the McGraw-Hill Publishing Co. See also *Scientific American Monthly* (June, 1921, p. 552), "Selenium and Tellurium," by Prof. Victor Lenher.—*Reports of Investigations, U.S. Bureau of Mines.*

Rubber in Aircraft

Proposed Experiments with Rubber Latex

AT a meeting of the London Section of the Institution of Rubber Industry, held at the Engineers' Club, London, on Monday, Mr. J. W. W. Dyer read a paper in which he detailed the uses of rubber as applied to both heavier-than-air craft and lighter-than-air craft, and indicated the directions in which further research and investigation is necessary. He gave the following list of the main applications of rubber to aircraft:—(1) To form the gas-holding layer and the outer protective layer for the envelopes of kite balloons, non-rigid and semi-rigid airships; (2) in the gas bags of rigid airships to form the adhesive by which goldbeaters' skin is stuck to the cotton fabric which is the base; (3) in shock-absorber cord for heavier-than-air craft; (4) in petrol hose; (5) for tyres on the wheels of aeroplanes; (6) in many electrical insulating materials generally.

Experience with the shock-absorber cord and petrol hose suggested, he said, the possibility of their supersession by other materials, unless improvements could be carried out. With regard to petrol hose, it was hoped that the use of internally-doped tubing would do away with the difficulties arising from the occasional disintegration of the rubber.

Dealing more specifically with the use of rubber for lighter-than-air craft, it was pointed out that for envelopes and ballonets of these craft, 2 or 3-ply cotton fabrics were used, in which one or more layers of rubber acted as the gas-holder, while in almost all cases another external one, with an aluminium coating, is present. The gas-holding layers in these fabrics contained a high proportion of rubber, usually more than 95 per cent. Some makers added to the mixing nothing but sulphur, others used a little mineral accelerator, usually litharge, and still others a notable amount, up to 10 per cent. or so, of litharge. There was evidence, however, that the gas-holding properties of this last type of proofing were not maintained satisfactorily when tension was applied to the fabric.

Use of Dyes

A process by which certain red and yellow dyes were dissolved in the rubber had been introduced, and it helped to concentrate attention on various ways of defeating the deleterious action of light. The dye process—so-called "molecular protection"—was highly successful in protecting rubber, and was used actually in the principal layer to be protected, as well as in the outer layer, if one were present. The use of a high proportion of litharge, say, up to 20 per cent., in the outer layer, gave good protection, but though generally it was referred to as the heavy litharge protection, it probably actually depended for much of its virtue on the opacity of the lead sulphide which was formed. The dye method, however, did little to preserve the cotton, and it was here that the serious attention of manufacturers was demanded. Another destructive agent was acidity in the fabric, an obvious source of which was the free sulphur always present in some degree, but from evidence obtained from various directions Mr. Dyer expressed the opinion that acidity plays a very small part, or none at all, in the deterioration of the cotton. He suggested, however, that tests might be carried out to determine the minimum weight of gas-holding layer for good robustness, the effect on the thinner gas-holding layers of a little, say 10 per cent., of mineral addition, such as litharge, as compared with pure rubber-sulphur; and whether the degree of cure was of any importance.

Coming to the main use of rubber in rigid airship work, namely, in the manufacture of the gas bags, it was pointed out that the rubber in this case was merely an adhesive, the gas-holding element of the fabric being goldbeaters' skin. Up to the present, in British practice, rubber was the only adhesive that had been used. The Germans, however, used a form of glue, and we in this country had also experimented with it. Experiments had shown that the movements of glue-proofed fabric under changes of temperature were in harmony with those of the goldbeaters' skin, while those of rubber-proofed fabrics were in opposition. The second difference was that glue was a very much better adhesive for skins than rubber, quite apart from expansion and contraction effects.

Mr. Dyer then discussed the possibility of a simple rubber-proofed fabric with no skin lining, and expressed the opinion that when rigid airship construction was actively resumed attempts would be made to find an actual substitute for goldbeaters' skin. Many experiments had been made to obtain a thin film of suitable plastic material, but whether a rubber-proofed fabric could be made to meet both weight and permeability requirements was at present somewhat doubtful. One piece of information that would be useful in approaching this problem of manufacturing a light-weight, low-permeability, rubbered fabric, was what might be called the intrinsic permeability of rubber, prepared in different ways, both to air and hydrogen.

Finally, dealing with the fabric outer cover of rigid airships, the necessity for weather and light-proofness was emphasised, and it was pointed out that present practice ruled out entirely the possibility of using rubber, because the proofing material, a cellulose nitrate or acid dope, with various additions, was applied *in situ*, and was relied upon to produce nearly all the tautness which the fabric achieved by contraction on drying. Doping *in situ* was an expensive and wasteful operation, and there were those who, looking ahead, had said that some other system must be adopted.

Discussion

Mr. J. H. MANDELBERG said that, in the present state of knowledge, he did not see how rubber could compete with goldbeaters' skin for the gas-holder, because goldbeaters' skin had practically complete impermeability to hydrogen. Mr. FORDYCE JONES pointed out that Dr. Dittmar was said to have compounded celluloid in rubber, and that opened up possibilities. Mr. FREDERICK KAYE suggested the importance of investigating the effect of temperature, which was perhaps more destructive of the fabric than light. With regard to the doping of airship fabrics, he had investigated the question of the effect of such salts as sodium acetate. If they took a weak solution of sodium acetate, and shook it up with a small quantity of sulphur, they would find in a very short time, if the solution were filtered and barium chloride added, that there was an appreciable precipitate, apparently sulphate, and it appeared to him that such salts as sodium acetate, which were dissociable, were a ready means of causing sulphur to vulcanise, so that some of the acidity figures obtained from experiments on fabrics might be due to the sulphur that was developed by the action of a salt which had been put into the fabric as a protective in the first instance. His experiments had shown that sulphur could very easily be oxidised by the action of salts such as sodium acetate. Dr. H. P. STEVENS suggested experimenting with rubber latex for the proofing of fabrics; Mr. HERBERT ROGERS supported this suggestion, and Dr. PHILIP SCHIDROWITZ suggested that a rubber-glue mixture was very much superior to rubber alone, for the simple reason that glue was very much more resistant to the passage of gases than rubber itself.

Chemical Manufacturers' Failure

A COMPULSORY winding-up order was made against A. T. Kremer's Manufacturing Co., Ltd., 36, Great James Street, Bedford Row, London, manufacturers of chemicals, dyes, colours, etc., last June, upon a creditors' petition, and the statutory first meeting of the creditors and shareholders was held on September 19, at the Carey Street offices of the Board of Trade, Lincoln's Inn, W.C.

Mr. E. T. A. Phillips, official receiver, reported that the company was formed in June, 1920, as a private company, with a nominal capital of £2,000, to acquire and carry on the business of "K. and S. Manufacturing and Trading Co., Ltd.," then belonging to Mr. A. T. Kremer, and to act as import and export merchants in chemicals, dyes and colours. Mr. Kremer was appointed as governing director, and was a present creditor for £149. A small net profit was made on the trading for the first twelve months, but during the six months ended January last there was a loss of £1,807. A resolution for voluntary liquidation was passed in March, with Mr. Kremer as liquidator, and a scheme for a composition was framed, but it fell through, and a compulsory winding-up order was obtained by a creditor in Switzerland. The failure was attributed to insufficient working capital, restricted credits, and the general slump in trade. The accounts showed liabilities £2,736, against assets valued at £566, and a deficiency of £3,670 with regard to contributories. Mr. C. H. Nathan, C.A., was appointed liquidator.

Affairs of Inecto, Ltd.

A COMPULSORY winding-up order has been made against Inecto, Ltd., 15A, North Audley Street, London, W., on a creditor's petition, and the statutory first meetings of the creditors and shareholders were held on September 28, at the Board of Trade Offices, Carey Street, London, W.C. Mr. E. T. A. Phillips, Official Receiver, reported that the company was formed in August, 1918, with a nominal capital of £20,000, to acquire as a going concern the business then being carried on as Inecto, Ltd., at the above address, and to carry on the manufacture and sale of a compound known as "Inecto," also to carry on business as manufacturers, buyers and sellers of and dealers in hair dyes and toilet preparations; and, further, to enter into an agreement for the acquisition of the assets of Inecto, Ltd., then in voluntary liquidation. Mr. Philip Walley Ducker was appointed governing director. It appeared that the old company, Inecto, Ltd., was formed in March, 1911, and under the sale agreement the new company was to take over the assets from the old company as from March 31, 1918, including the goodwill and exclusive right to use the old company's name, all interests and rights in secret processes or recipe for the manufacture of Inecto, and the old company's interest in part of the North Audley Street premises. Mr. N. B. Ducker had stated that the business of the sale of Inecto was now being carried on by a company styled Rapidol, Ltd.

The chairman remarked, in conclusion, that the present position of the company was apparently due to actions which arose from people who alleged that they had suffered injury from the use of Inecto. In the absence of any resolution, the liquidation remains in the hands of the Official Receiver.

Science in British Foundry Practice

ON September 30 the Newcastle and District Branch of the Institution of British Foundrymen elected a chemist as its president for the ensuing year, Mr. H. J. Young, F.I.C., of Wallsend. Mr. Young, in his presidential address, said that it was an honour to his profession to have a member elected as president of their Institution. At the present time science was badly wanted in British foundry practice, and he deplored the fact that there were not more scientific methods adopted. Science was the secret of a great deal of success in Germany. He suggested that Germany employed more scientific thinking on all industrial questions than was the case in this country. In this country a clean sweep should be made of all foundry methods which had become out of date, and every foundry should have, as an essential, an up-to-date and well-equipped laboratory. Membership of the Cast Iron Research Association was also an essential step to be taken by every foundry in the country. By being members of that Association and having their own laboratories they would benefit enormously by its research work. It was deplorable that there were still many foundrymen who knew little or nothing about their metals, their sands or their furnaces, nor did they read what the rest of the foundry world was thinking and doing.

Chemical Industry Club

IN connection with the forthcoming annual general meeting of the Chemical Industry Club the following members of the Executive Committee retire this year, and, with the exception of Mr. Graham, offer themselves for re-election:—A. J. Chapman, W. Cullen, W. Graham, F. E. Hamer, T. Miller-Jones.

The annual dinner of the Club will be held at the Connaught Rooms, Kingsway, London, on Friday, November 24 next. Among the speakers who have promised to be present are Lord Riddell and Mr. Roscoe Brunner.

The Price of Benzole

THE National Benzole Co., Ltd., announce that they are prepared to continue the sale of National benzole mixture, containing a guaranteed quantity of 50 per cent. National benzole and 50 per cent. No. 1 petrol at the reduced No. 1 price. The current retail prices of National benzole and National benzole mixture as from September 27 are as follows:—National benzole, cans, 2s. 4d. per gallon; National benzole mixture, cans, 2s. per gallon.

British Laboratory Ware Association

THE British Laboratory Ware Association, Ltd., was registered on September 23 as a company limited by guarantee. The objects are: To take over all or any part of the business and activities of the British Laboratory Ware Association, Ltd. (incorporated in 1915), to register and use a trade mark in respect of any specified goods or classes thereof as may be arranged or approved of by the Board of Trade; and have complete control thereof, and permit the use of the trade mark on such conditions as the Association may think fit; to protect the interests of members and others manufacturing and dealing in goods manufactured of glass, porcelain, filter papers and general laboratory ware and requisites, and surgical, medical, chemical, physical, electrical, optical, mechanical and scientific appliances; to provide for the examination of any such goods in respect of origin, material, mode of manufacture, quality, accuracy or other characteristics; to promote the manufacture of such goods; and circulate and furnish information and advice to persons and corporations engaged in the trade, particularly in connection with prices and foreign competition; to prepare and advise on forms of agreement with manufacturers and suitable for use by members of the Association, and to negotiate agreements with any such persons on behalf of the members; to protect the trade against offences under the Merchandise Marks Act, and prevent the use of false trade marks and description in respect of such goods and materials made in imitation thereof, etc. The management is vested in a Council, the first members of which are: Messrs. H. G. Jarrom, 19–21, Sun Street, London, E.C., chemical apparatus manufacturer; C. A. Mercer, 34, Camomile Street, London, E.C., chemical apparatus manufacturer; J. George, 17–27, Hatton Wall, London, E.C., manufacturer; A. L. S. Wood, Kemble Street, Kingsway, London, W.C., chemical apparatus manufacturer; H. S. Shorthouse, 144, Edmund Street-Birmingham, chemist; S. Belcher, 61, Church Street, Birmingham, chemical apparatus manufacturer; F. W. Branson, F.I.C., 14, Commercial Street, Leeds. Mr. H. G. Jarrom is the first chairman. The solicitors are Janson, Cobb, Pearson and Co., 22, College Hill, London, E.C.4, and the registered office is at 80A, Coleman Street, London, E.C.

No Income Tax Rebates for Chemists

IN December, 1920, the Commissioners of Inland Revenue received a deputation from the National Union of Scientific Workers, the Institute of Chemistry and other bodies, who presented a request that abatements of income tax should be allowed to scientific workers in respect of subscriptions to societies and to libraries and periodicals, purchase of books and instruments, damage to clothing, travelling expenses to meetings and conferences, rent and expenses of private laboratories and studies, and other expenses incurred in research. The Commissioners stated that the claims of persons who derived their incomes from appointments—as distinct from independent practice—would be decided according to the terms of their respective appointments, and could not ordinarily be allowed except where it could be proved to the satisfaction of the Commissioners that the expenses were incurred necessarily, wholly and exclusively in the performance of duties required to be carried out under formal agreements.

The *Journal* of the Institute states that the Council have lately had before them the decision of the Board of Inland Revenue contained in a recent letter to the Institute of Journalists, and have suggested to the Board that some of the abatements therein allowed should be equally allowable to analytical and technological chemists and teachers of chemistry. The Council suggested that chemists engaged on research or experiment for the purpose of furthering knowledge should be allowed abatement in respect of the expenses involved; and with regard to travelling expenses that chemists should be allowed abatements in respect of the actual expenditure incurred in attending scientific meetings and conferences, although not in respect of the cost of travelling between their homes and places of business.

The Board have replied that they "have given the whole subject of the allowance of Income Tax in respect of the various expenses mentioned their most careful consideration, but that nothing has emerged to lead them to modify the views they expressed on the occasion of the deputation."

The Elections and Trade

By Sir Ernest J. P. Benn, Bart.

THE political excitements of the moment centre round the fact that within the near future we must have a general election. The political parties are all busy forming their own estimates of public opinion so that they may frame the appeal which they will presently make to the electorate in terms calculated to secure the maximum number of votes. This tendency is particularly noticeable in the case of the Labour Party, the most extraordinary development being Mr. Sidney Webb's attempt to show that the capital levy is a good business proposition. In these circumstances it behoves business men everywhere, and of every class, to consider their position and to do their utmost so to influence the political situation as to ensure that whatever the result of the election the minimum of damage shall be done to business.

The solicitors have set a good example to other trades and professions by the discussion which took place at the meeting of the Law Society in Leeds last week, when they turned aside from the consideration of merely legal questions and debated the broader issues of social policy. The indictment which Mr. Bond-Cocks, of Nuneaton, framed against the Civil Service is one of the most valuable contributions to the discussion of the matter made in recent days, and it would be well if every gathering of business and professional men were to devote part of its time to expressions of opinion on such political problems. There was a time when it was understood that politics and business had nothing in common. That happy state has passed. It is not the fault of the business men that the politicians have made use of the war to take over the whole realm of business and to fasten themselves upon every thought and every action of the business world, with results that are now painfully patent to everybody.

Principles of Commercial Prosperity

It is not, of course, possible that the whole body of business men as such could join the Conservative Party, or the Liberal Party, or the Labour Party. Business men will always differ in their views on those social questions which are properly within the scope of political activity, but it is possible that business men should understand and hold in common the simple basic principles upon which commercial prosperity depends, and that they should be able so to permeate at least the older political parties as to make sure that the maximum measure of freedom to develop trade was retained.

The business men could agree without any difficulty and with practical unanimity upon the great and all-important principles of freedom and economy. They might interpret these terms in slightly differing ways, but that, after all, would not matter. It is quite possible, if sufficient pressure were applied, to make every political candidate of every party own allegiance to these two principles.

There is, unfortunately, no political party about which the man whose only interests are business can get enthusiastic. This generation seems to have absorbed so thoroughly an exaggerated and impossible idea of the functions and the capabilities of public authority, that every political party has been obliged to concede to the State or the local governing body functions and responsibilities which were never contemplated by previous generations, and which nothing but bitter and costly experience will discredit. Every political party, even the bluest of the Tories, is committed to what is attractively labelled social reform, and is driven to promise to the electors something out of the public wealth which from its nature can never actually be given. For instance, there is not a politician in the whole long lists of any of the parties who has the pluck to say that the State's interest in houses destroys and does not build them. Similarly, there is no political meeting of any colour ever held which would fail to cheer some sneery remark about profit, so completely has the public forgotten that it owes every amenity it possesses to the discredited incentive of private gain, or, as Samuel Turner put it, "that profits are the sunshine of prosperity."

The business man in facing the political situation has, therefore, to remember that for the moment the outlook is at best hopeless. All that he can do is so to modify some of the prevailing notions as to render them rather less harmful than they otherwise would be. It is the duty of the business community to permeate every political party and to miss no opportunity of pointing out the folly of many of the ideas upon which our social activities are now founded. We have to go back to the middle of the last century to find the art of politics we want. The world is literally crying out for another John Stuart Mill or another Herbert Spencer. The latter's pamphlet, *Man versus the State*, is never now read—it is considered so out of date; yet without question it stands out to-day as one of the most important pronouncements in the English language. If every elector could be made, before casting his vote at the coming election, to read Mills's monograph "On Liberty" we could cut the national Budget down by nearly half, we could knock 75 per cent. off local expenditure, and abolish unemployment. The next generation will get back to Mill—this one has yet too much to learn.

Politics is a matter of labels. The Parliamentary candidate labels a bottle with the word "Education," and everybody applauds. Nobody bothers to look inside the bottle, nobody thinks of analysing the contents; the general public is above details, the bottle is labelled "Education," and that is all that matters, and therefore let us vote for it. One of the most popular brands of the political shopkeeper in recent years has been "Health." Every seeker after the suffrages of the people could draw the crowds by talking health. Our expenditure upon public health has reached a point when it exceeds the whole of the public expenditure of our grandfathers, and most people are happy about it. The death rate has gone down, epidemics are not so frequent, and therefore we pay cheerfully the salaries of numerous thousands who put all these things on to stupid card indices in hundreds of public buildings. Some day or another we shall wake up to the real facts, which, of course, are very different. While public health officials have been doubling their numbers and doubling their salaries, Lord Leverhulme has doubled the consumption of soap. Every man, woman, and child is able to wash with soap morning, noon, and night, a luxury which was unknown in quite recent times. That simple fact has more to do with the standard of public health than have all the Acts of Parliament on the Statute Book, and yet so strangely does the mind of the modern public work that Lord Leverhulme is cursed for his millions, while Dr. Addison is blessed for labours which have operated in a totally opposite direction.

As a public we are never tired of calling for progress, and then proceeding to adopt methods which are nothing but brakes on the wheel of progress. It seems to be the fate of the human being to get within reach of some new happiness and then deliberately to decline to accept it. Science and machinery are continually increasing the possibilities of output; continually offering to us more of this world's goods. We answer the offer by joining trade unions and reducing our output in proportion to the new facilities.

The Real Solution

The worst of arguing along these lines is that one appears on the surface to be an enemy of progress. The Socialist, or the Tory for that matter, will point to filthy slums and demand whether such abuses are to continue. The politician makes a lot out of slums. If one suggests that the Government as Government should do nothing, one is at once held up as an enemy of the public good. The difficulty is to make the electors see the real solution to the problem.

Commercial Influence on Politics

I am fully conscious that this is rather strong stuff, but I am talking to business men, and I venture to suggest to them that it is their duty to put forward an effort in connection with the forthcoming election to bring the public back to a sense of reason in these matters. The world is badly in need of a return to progress, and is in grave danger from the mistaken notion that progress can be secured through the authority of the State without individual work and effort. Humanity wants freedom to progress, and no effort should be spared to expose the futility of the Socialist ideal. We need to bring back to the individual the self respect which he is losing through the usurpations of that abstract eccentricity called the State. If the business ideal is kept well before the notice of the public the politicians of all shades of opinion will not fail to feel its influence, and the political atmosphere will in consequence become rather less impossible to real industrial and commercial progress.

From Week to Week

GERMAN ANILINE DYES have, it is reported, been subjected to a price increase of 100 per cent.

THIS YEAR'S CONFERENCE of the German Institute of Metals will be held at Essen from October 14 to October 17.

NEGOTIATIONS are said to be in progress for the amalgamation of the Timber Fireproofing Co. with the Fireproof Wood (Oxylene) Manufacturing Co.

NEW OFFICES with over 120,000 ft. of floor space are to be built on a site in Finsbury Circus and Finsbury Pavement, London, for the Anglo-Persian Oil Co., Ltd.

THE APPEAL for funds for Armstrong College, Newcastle, has resulted in donations amounting to £167,000. In addition, £26,000 has been raised for the College of Medicine.

ACCORDING to advices from Milan the Consortium of Scientific Institutions has assigned 5,000 sq. metres of ground to the new "Ronzoni" Chemical Industries Institute.

SIR HENRY WHEELER, Governor of Bihar and Orissa, on Monday, opened the works at Jalpa, Bihar, of the Sone Valley Portland Cement Co. The works are reported to have cost over £500,000.

E. H. GEDDES AND CO., chemical merchants, announce the removal of their offices to Leadenhall Buildings, Leadenhall Street, London, E.C.3. The telephone number remains unchanged—Avenue 8458.

WORKS for the manufacture of asbestos will, it is stated, be erected shortly near Dunfermline. The factory will be used by Basalt Manufacturers, Ltd., and it is understood that contracts for plant have already been placed.

THE OPENING MEETING of the Manchester Section of the Society of Dyers and Colourists will be held on October 13, when the chairman (Mr. William Marshall, F.I.C.) will give an address on "The Dyeing and Finishing of Ramie."

AFTER MANY YEARS of service as chief representative of Lever Brothers, Ltd., at Swansea, Mr. J. Martin Curnow, of Swansea, has been presented by Lord Leverhulme with a gold watch, badge, and certificate as a mark of appreciation of his services.

ACCORDING to reports from Melbourne the British Broken Hill Proprietary Co. has made an application to the court asking it to declare invalid the agreement with the Broken Hill Associated Smelters Proprietary, Ltd., for the treatment of its lead concentrates output.

AMONG the papers to be read at a meeting of the Optical Society, at the Imperial College of Science and Technology, on October 12, is one by Mr. F. W. Preston on "The Structure of Sand-blasted and Ground Glass Surfaces." There will also be exhibited a new chemical spectrometer by Adam Hilger, Ltd.

ACCORDING to advices from Berlin, the combine consisting of the Badische Co., Hoechster Dye Works, Friedrich Bayer and four other dye and chemical concerns, proposes to double its capital. The new capitalisation will be 3,400,000,000 marks. The last capital increase, also carried through by all seven companies, took place in January this year.

IT WAS ANNOUNCED on September 30 by Dr. Riley, director of education for Hull, that Mr. T. R. Ferens had placed a site at the disposal of the education authorities and that it was hoped when the financial situation became easier to develop a university college for the city. Mr. Ferens was formerly member of Parliament for East Hull and is a director of Reckitt and Sons, Ltd.

IN ADDITION to the papers already announced, the following, both by W. H. Patterson, were read at a meeting of the Chemical Society on Thursday: "Rates of reduction of nitro groups by hydrogen in the presence of colloidal palladium, especially of nitro-toluene isomerides"; "A determination of the relative proportions of the isomerides in nitro-toluene or toluidine."

WE UNDERSTAND that a proposal is on foot to form a company with a capital of £1,000,000 with a view to establishing an oil enterprise at the Cardiff Docks. Whilst it is not proposed at the outset to establish an oil refinery in the Welsh metropolis, sufficient land for the purpose will be reserved. The company are assured of the support of the Great Western Railway Company, both as regards the site and in the provision of wharves and other facilities.

HEAVY INCREASES under all heads of goods received from Germany into the United Kingdom during the month of August are noticed, the total increases for the preceding month being £109,217, and compared with August, 1921, the increase is £91,442. Dyes and dyestuffs, owing to the receipt of 522 cwt. of alizarine and the increase in the value of other finished dyestuffs, has gone up £18,868. The value of imported scientific instruments has increased by £2,695.

A DEPUTATION from the Association of British Chambers of Commerce waited upon the Chancellor of the Exchequer on Tuesday to urge upon the Government "the necessity for a speedy settlement of the Reparations question in the interests of British trade and commerce." Sir A. Shirley Benn, Mr. A. Balfour, Sir Albert Hobson, and Sir Edgar Sanders put the case on behalf of the deputation, and the Chancellor promised to give the views of the deputation his careful consideration.

IT IS STATED officially at Washington that the United States claims against Germany for the cost of the American Army of Occupation, amounting to over £50,000,000, will be settled under an agreement whereby the American Government will receive its share from Germany of dyestuffs under the Reparations agreement, but without cash payment as heretofore. The value of these dyes, says the Exchange, will be credited against the American bill. It is learned that Germany has agreed to this method after consulting the Allied Governments.

THE BOARD OF TRADE notify that no claims against Germany for restitution under the provisions of Article 238 of the Treaty of Versailles, of cash, securities, or other property seized or sequestrated in occupied territory will be entertained by their Reparation Claims Department, except in cases which have been notified to the department, Cornwall House, Stamford Street, London, S.E.1, and full particulars of which have been furnished prior to October 28 next. All claims for restitution which have been notified, but in respect of which all the particulars and information which have been asked for by the Reparation Claims Department have not been furnished prior to October 28, will be presumed to have been abandoned.

A NEW DEVELOPMENT at the University of Birmingham is the division of the Chair of Mining (which was held by Sir John Cadman) into two professional chairs. One professor will be concerned with coal and metal mining and the other will be wholly engaged with the department and school of petroleum and oil engineering. The latter school is very largely due to the large sum of money which has come to the University from the leading persons engaged in the oil industry in Great Britain, and it is the intention of the University to build up a great school of oil engineering, which, with the exception of the work done at the Imperial College, London, will be the only such school in the British Empire.

AT THE OPENING on Wednesday of the eighty-first session of the School of Pharmacy, carried on under the Pharmaceutical Society, the inaugural address was delivered by Mr. H. J. Waring, vice-chancellor of the University of London, and the Hanbury Gold Medal was presented to Professor E. Perrot, for research in the natural history of drugs. Mr. Waring said the vocation of pharmacy had not occupied such a position in the technical vocations as it was worthy of. If the society would bring forward a concrete scheme asking that either pharmaceutical chemistry should be made the chief subject for a science degree or that a new degree, such as bachelor of pharmacy, should be instituted, the University of London would try to meet them in every way.

THE JOINT MEETING of the Faraday Society of the British Cold Storage and Ice Association in October will be divided into three sessions, at the first of which laboratory methods of liquefaction and methods of measuring low temperatures will be discussed. The opening address will be delivered by Professor H. Kamerlingh Onnes, and Dr. Crommelin will give a description of the equipment of the cryogenic laboratory at Leyden. The second and third sessions will be devoted to industrial methods of liquefaction and practical applications of low temperatures. A general introduction will be given by Mr. K. S. Murray of the British Oxygen Co., Ltd. M. Claude will deal with the industrial manufacture of hydrogen by the partial liquefaction of water gas, and Mr. E. A. Griffiths with the subject as it touches aeronautical work. Invitations have been extended to members of the London Section of the Society of Chemical Industry and to the Physical Society of London. Others desirous of attending should communicate with the Secretary of the Faraday Society, 10, Essex Street, London, W.C.2.

References to Current Literature

British

RUBBER.—Studies in vulcanisation; some further effects of acceleration on the rubber stress-strain curve. P. Schidrowitz and P. L. Bean. *J.S.C.I.*, September 30, 1922, pp. 324–326 T.

The effect of the acetone-soluble constituents of rubber on the vulcanising properties. H. P. Stevens. *J.S.C.I.*, September 30, 1922, pp. 326–328 T.

ADHESIVES.—Sodium silicate as an adhesive. R. Furness. *J.S.C.I.*, September 30, 1922, pp. 381–384 R.

HYDROGENATION.—Technical aspects of hydrogenation. *J.S.C.I.*, September 30, 1922, pp. 384–387 R.

NITROGEN FIXATION.—Post-war progress in the fixation of nitrogen. *J.S.C.I.*, September 30, 1922, pp. 387–390 R.

GENERAL.—The organisation of research. J. C. Irvine. *Nature*, September 16, 1922, pp. 385–388.

The protection of inventions: an Empire patent. *Nature*, September 30, 1922, pp. 437–439.

CORROSION.—The corrosion of cast iron and lead pipes in alkaline soils. J. W. Shipley. *J.S.C.I.*, September 30, 1922, pp. 311–316 T.

The corrosion of iron and steel. R. Hadfield. *Roy. Soc. Proc.*, September 1, 1922, pp. 472–486.

METALLURGY.—Gold metallurgy on the Witwatersrand (Transvaal). W. Cullen. *J.S.C.I.*, September 30, 1922, pp. 316–321 T.

EXPLOSIVES.—Organic impurities in commercial nitric acid and their effect in the manufacture of nitroglycerin. F. A. F. Crawford. *J.S.C.I.*, September 30, 1922, pp. 321–326 T.

COMBUSTION.—Experiments on the ignition of gases by sudden compression. H. T. Tizard and D. R. Pye. *Phil. Mag.*, July 1922, pp. 79–121.

ANALYSIS.—Graphites and other pencil pigments. C. A. Mitchell. *Analyst*, September, 1922, pp. 379-387.

The estimation of meconic acid in opium. H E. Annett and M. N. Bose. *Analyst*, September, 1922, pp. 387–391.

CARBOHYDRATES.—Some research problems in the carbohydrates. Cellulose, starch, inulin. J. C. Irvine. *Chem. News*, Part 1, September 22, 1922, pp. 165–170; Part II, September 29, 1922, pp. 181–187.

United States

ARTIFICIAL SILK.—The artificial silk industry. H. Schlatter. *Chem. and Met. Eng.*, September 13, 1922, pp. 533–537.

ELECTRO-CHEMISTRY.—Application of electric service to the chemical industry. W. B. Todd. *Chem. and Met. Eng.*, September 13, 1922, pp. 552-554.

INKS.—Manufacture and properties of writing inks. F. F. Rupert. *Chem. Age* (*N. York*), August, 1922, pp. 345–348.

FOODSTUFFS.—Manufacture of white potato flour. W. A. Noel. *Chem. Age* (*N. York*), September, 1922, pp. 381-384.

BENZOL.—Benzol poisoning: its occurrence and prevention. C. F. Horan. *Chem. Age* (*N. York*), September, 1922, pp. 407-409.

CARBON.—American production of activated carbon. *Chem. Age* (*N. York*), September, 1922, pp. 414-416.

HANDLING MATERIALS.—The steel belt in material handling. H. Carlson. *Chem. Age* (*N. York*), September, 1922, pp. 419-420.

Safety in the handling and use of acids. M. F. Grass. *Chem. Age* (*N. York*), September, 1922, pp. 417-418.

Safe handling of materials in chemical plants. W. G. Whitman. *Chem. Age* (*N. York*), September, 1922, pp. 377-379.

COLLOIDS.—Colloid chemistry. J. Alexander. *J. Ind. Eng. Chem.*, September, 1922, pp. 800–802.

LEATHER.—Review of analytical work applicable to leather and tanning, 1920–1921. F. P. Veitch and F. W. Frey. *J. Ind. Eng. Chem.*, September, 1922, pp. 825-829.

Vegetable tanning. A. W. Thomas. *J. Ind. Eng. Chem.*, September, 1922, pp. 829-831.

Mineral tannages. F. L. Seymour-Jones. *J. Ind. Eng. Chem.*, September, 1922, pp. 832–834.

The preparation of skin for tanning. J. A. Wilson. *J. Ind. Eng. Chem.*, September, 1922, pp. 834–836.

RUBBER.—Scientific method in rubber compounding. C. O. North. *J. Ind. Eng. Chem.*, September, 1922, pp. 851–853.

The chemistry of rubber vulcanisation and acceleration. C. W. Bedford. *J. Ind. Eng. Chem.*, September, 1922, pp. 856–857.

PAPER.—Recent advances in pulp and paper. C. J. West. *J. Ind. Eng. Chem.*, September, 1922, pp. 858–860.

WOOD DISTILLATION.—Hardwood distillation. H. C. Merriam. *J. Ind. Eng. Chem.*, September, 1922, pp. 860–862.

FUEL.—The application of chemistry to the conservation of motor fuels. T. Midgley and T. A. Boyd. *J. Ind. Eng. Chem.*, September, 1922, pp. 849–851.

COKING.—By-product coking. F. W. Sperr. *J. Ind. Eng. Chem.*, September, 1922, pp. 844–846.

French

ANALYSIS.—Quantitative micro-analysis. M. Nicloux and G. Welter. *Chim. et Ind.*, August, 1922, pp. 269–272.

Approximate volumetric estimation of barium. M. Polonovski. *Bull. Soc. Chim.*, August, 1922, pp. 810–813.

New method for the qualitative separation of the alkaline earth metals. M. Polonovski. *Bull. Soc. Chim.*, August, 1922, pp. 806–810.

ACIDS.—Manufacture of sulphuric acid by the lead chamber process. P. Truchot. *Chim. et Ind.*, August, 1922, pp. 289–295.

ANTHRAQUINONE.—The ureas of anthraquinone. M. Battegay and J. Bernhardt. *Chim. et Ind.*, August, 1922, pp. 305-306.

Urethanes of anthraquinone. M. Battegay and J Bernhardt. *Chim. et Ind.*, August, 1922, p. 307.

CEMENT.—High resistance cements. J. Hendrickx. *Chim. et Ind.*, August, 1922, pp. 296–304.

PHOTOGRAPHY.—Colour photography. J. Thovert. *Chim. et Ind.*, August, 1922, pp. 312-315.

Sensitisation and desensitisation of gelatine-silver bromide plates. A. Seyewetz. *Chim. et Ind.*, August, 1922, pp. 308–311.

LEATHER.—Chrome tanning using chrome alum as starting material. P. Chambard and L. Meunier. *Chim. et Ind.*, August, 1922, pp. 325–329.

FERMENTATION.—The production of wine. E. Barbet. *Chim. et Ind.*, August, 1922, pp. 330–336.

OXIDATION.—The autoxidation of organic sulphur compounds. M. Delépine. *Bull. Soc. Chim.*, August, 1922, pp. 762–789.

SUGARS.—The inversion of saccharose by alkaline copper solution. L. Maquenne. *Bull. Soc. Chim.*, August, 1922, pp. 799–806.

SALTS.—The transformation of sodium formate into oxalate. C. Matignon and G. Marchal. *Bull. Soc. Chim.*, August, 1922, pp. 789–796.

The question of the crystallisation of potassium chloride on the large scale. C. Rinckenbach. *Chim. et Ind.*, August, 1922, pp. 278–288.

German

MANGANESE COMPOUNDS.—Trivalent manganese. Part III. J. Meyer and W. Schramm. *Z. anorg. u. allg. Chem.*, July 21, 1922, pp. 56–68.

CHLORINE.—The thermal decomposition of chlorine. A. Henglein. *Z. anorg. u. allg. Chem.*, August 8, 1922, pp. 137–165.

REACTIONS.—Velocity of the reaction of oxygen, hydrogen sulphide and halogens with metals. G. Tammann and W. Köster. *Z. anorg. u. allg. Chem.*, August 8, 1922, pp. 196–224.

Action of bromine on methylal. F. Feist. *Z. angew. Chem.*, September 5, 1922, pp. 489-490.

TECHNOLOGY.—The protection of surfaces by paints. J. F. Sacher. *Z. angew. Chem.*, September 1, 1922, pp. 481–483.

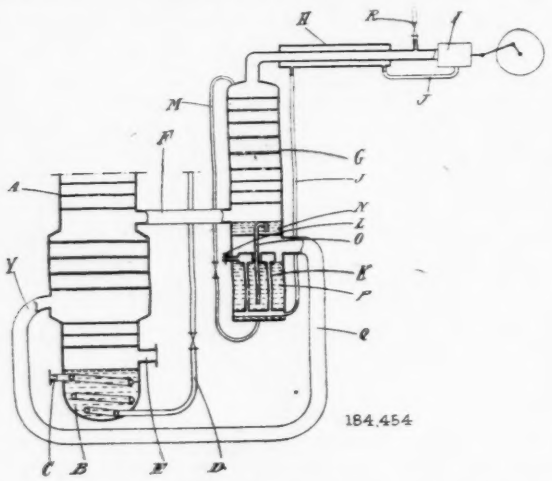
ALDEHYDES.—Reduction of acid chlorides to aldehydes by means of a nickel catalyst. H. Schliewiensky. *Z. angew. Chem.*, September 1, 1922, p. 483.

Patent Literature

Abstracts of Complete Specifications

184,454. Separation of the Elementary Constituents of Air or other Gaseous Mixtures, Process for. L'Air Liquide Soc. Anon pour l'Etude et l'Exploitation des Procédés G. Claude, 48, Rue St. Lazare, Paris. International Convention date, August 12, 1921.

The apparatus is for the extraction of argon during the liquefaction of air without impeding the working of the rectifying column. The illustration shows the lower part A of the liquid air rectifying column. The liquid oxygen is vaporised in the bottom V by cold compressed air passing through a coil C, the air being liquefied and then conveyed through a pipe D into the rectification column, while the oxygen gas is drawn off at E. Gases rich in argon are drawn off at F and



pass upwards through a rectifying column G and heat exchanger H to a compressor I which forces the gases through a pipe J to the heat exchanger, and thence to the vaporising liquefier which is provided with tubes K. The liquid passes through a pipe M to the top of the column G to be rectified. The gases rich in argon are removed, and the liquid which collects at the bottom is similar in composition to the gases removed through F. The liquid passes into the vaporiser P and the gases formed pass through the pipe Q to the main column A at Y. When the compressor I is started, the gases issuing from the top of the column G become progressively richer in argon, and practically the whole of this gas, containing very little nitrogen, can be drawn off through a valve R. A modification of this apparatus is also described.

185,135. Gas and Carbonaceous Materials, Production of. J. H. Reid, Readsboro, Vermont, U.S.A. Application date, February 22, 1921.

The apparatus is more particularly for the production of a mixture of carbon and lime and its subsequent conversion into carbide. In this invention a mixture of calcium carbonate and bituminous coal in the proper proportions is heated to 2,600°–2,800° F., at which temperature the normally liquid products arising from the distillation of the bituminous coal are cracked and form gaseous products. No liquid tar oils are obtained as a result of this distillation. The solid residue is conveyed directly to a crusher and thence to an electric furnace without material loss of heat, so that the charge in the furnace is initially at a temperature of about 2,000° F. This process results in the production of a large volume of gas of high heating value, the quantity being increased by the cracking of the tarry constituents of the coal. The use of limestone in place of lime results in the production of about three times the usual quantity of carbon monoxide, while only a small excess of coal is necessary. The production of carbide is rendered cheaper by the use of calcium carbonate, and the process may be continuous from the retorts to the electric furnace. A detailed description of the electric furnace is given.

185,137. Anthraquinone Dyestuffs, Manufacture of. F. W. Atack, and C. W. Soutar, of British Alizarine Co., Ltd., Trafford Park, Manchester. Application date, February 23, 1921.

Halogenated derivatives of N-dihydro-1.2.2^1.1^1. anthraquinone azine are usually prepared by the condensation of halogenated amino anthraquinones in the presence of a copper salt, but the product usually contains impurities which affect the colour. It is now found that if the crude product is treated in suspension or solution in an inert liquid at a temperature of about 120° C. with chlorine or bromine or substances producing these *in situ*, the impurities are also halogenated and rendered soluble, so that they can be removed. Details of the treatment of crude 3.3^1-dibrom compound of N-dihydro-1.2.2^1.1^1. anthraquinone azine are given.

185,140. Cracking Hydrocarbons or other Oils, Apparatus for. A.A.F.M. Seigle, 3bis Rue Clément Marot, Paris. Application date, February 24, 1921.

The process is for cracking hydrocarbons such as mazout, heavy oils derived from coal, peat, petroleum, schist, lignite, or coal tars, etc. The oil is passed through one or more retorts of cylindrical form having a central axial heating conduit surrounded by conduits formed by partitions in the annular space, which force the oil to circulate in the manner of a coil. The retorts are arranged end to end, and the central heating conduit is made of a gradually increasing diameter, while the oil is passed through in counter-current. The cracked oil is then subjected to two expansion and cooling stages separated by a reheating stage due to compression, in which the vapour at a temperature of about 650° C. is suddenly expanded and cooled to about 260° C. in the first apparatus, heated to 300° C., and then cooled to about 160° C. in the second apparatus. Each cooling and expansion apparatus contains water which is kept boiling at a determined pressure, and the cooling of the gases is effected by transfer of the heat to the water to vaporise a portion. During this process the vapour passes through a series of layers of catalytic material consisting of metal turnings of iron, aluminium, copper, and ferro-nickel, which facilitate the breaking up of the hydrocarbon molecule.

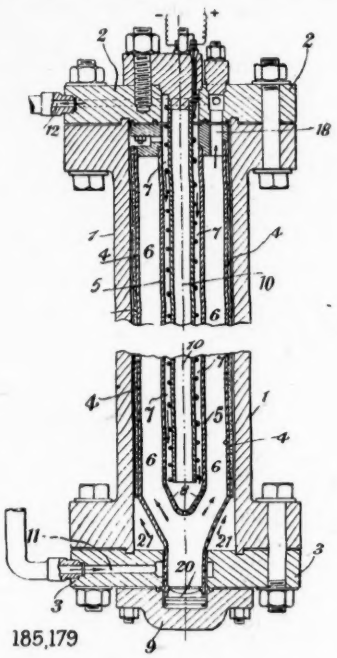
185,174. Fuller's Earth, Charcoal and Like Purifiers of Fats and Fatty Oils, and Catalysts Used in Hydrogenating Fats and Fatty Oils, Regeneration of. E. R. Bolton and E. J. Lush, Technical Research Works, Ltd., 4, Milner Street, London, S.W.3. Application date, May 24, 1921.

In processes of refining oil, a quantity of oil is usually retained in the fullers' earth, charcoal or spent catalyst, and the object is to remove this oil so that the purifying material can be used again. Superheated steam is passed through the material until the temperature is raised to 230°–300° C., when the oil in the material is hydrolysed into fatty acid and glycerine, which distil off with the steam. The glycerine may be recovered if the steaming is commenced under pressure, and the subsequent distillation effected without pressure or under vacuum. The activity of the product may still be affected by traces of organic impurities, but these may be removed by blowing air through the mass to char these substances and then steaming and cooling the product.

185,179. Ammonia, Apparatus for the Catalytic Synthesis of. L. Casale and R. Leprestre, 9, Via del Parliamento, Rome. Application date, May 24, 1921.

A strong outer tube 1 is closed by plates 2, 3, and encloses two thin concentric tubes 4, 5, between which the catalytic mass is placed in the space 6. Heat is supplied by a resistance coil 10 in the centre, which is not in contact with the tube 5. The tube 4 tapers at the bottom and projects through the plate 3, the end being closed by a disc 20 which is retained in position by a cover 9. The tube 4 is covered with insulating material, but a space is left between this and the tube 1 for the passage of gas. The reacting gases are admitted through the passage 11 to the space 21, and pass upwards over the insulating material and then by a passage into the internal space 7. The gases are heated by their passage over the resistance 10,

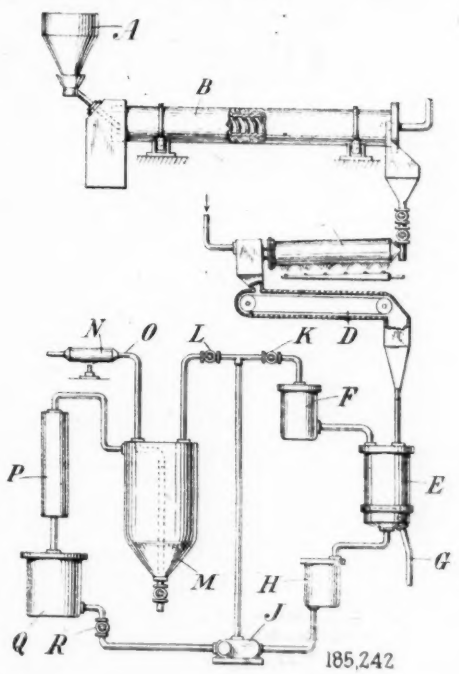
and then pass through apertures 8 to the catalytic space 6. The gas finally passes through conduits 18, 12 to a single outlet 15. The passage of the cooled gas between the insulating material and the external tube cools the latter and moderates the reaction in the space 6, so that excessive heating



of the catalyst is avoided. In a modified apparatus, one or more additional tubes may be provided in the space between the tubes 1 and 4 so that the incoming gases pass upwards and downwards in a tortuous path before reaching the tube 7. The tube 1 is thus more effectively protected from the influence of the internal temperature.

185,242. Ores Containing Oxidised Copper Compounds, Treatment of. H. L. Sulman and H. F. K. Picard, 44, London Wall, E.C.2; T. J. Taplin (Junior), 16, Lordship Park, Stoke Newington, London, N.16; W. G. Perkins, 1, London Wall Buildings, London, E.C.2. Application dates, June 9, July 16, August 6, and December 9, 1921.

The process is for obtaining the copper by a leaching method from oxidised copper ores containing silicate of copper such as chrysocolla; copper carbonate or hydrated basic carbonate such as malachite and azurite; or oxychloride of copper such as atacamite. The ore is crushed, and heated in a reducing gas to 150°–400° C. for a short time (15 minutes to 1 hour), and it is then found that the copper compound is reduced without melting or alloying the copper, and without fritting the gangue, leaving the reduced material in a porous condition in which it can be readily extracted by leaching. The ore is cooled and leached with an ammonia solution containing a small proportion of ammonium carbonate, in the presence of air or oxygen. The ammonia is distilled off, and absorbed in water for use again, while the copper is precipitated as oxide. This process is suitable for treating ores which are too poor in copper for smelting, and are relatively insoluble in the usual solvents. It is important to keep the temperature at which the ore is reduced as low as possible since the solubility diminishes if higher temperatures are used. Any copper sulphide in the ore is not affected by the reduction operation or by leaching, and may be recovered by concentration, flotation or other means. The process is also applicable to oxidised copper ores containing earthy carbonates or other strongly basic materials, since these do not affect the ammoniacal solvent in the way that an acid solvent would be affected. In an example, oxidised copper ore containing 6·49 per cent. of copper was treated. The copper was present as malachite 0·75 per cent., sulphide 0·2 per cent. and the remainder as chrysocolla. The gangue contained 34 per cent. calcium carbonate but was mainly siliceous. The ore was crushed and heated to 410° C. with reducing gas, and then cooled. The product was leached with a solution of ammonia and ammonium carbonate containing about 7 per cent. of ammonia, and air was injected into the pulp thus obtained to assist in the solution. After 6 hours the solution was freed from ammonia by distilling, and the resulting copper oxide obtained contained 80·4 per cent. of the total copper in the ore. Other examples are given of the treatment of a South African ore, and atacamite. In the latter case the reduction must not be effected above 300° C., to avoid volatilising the cuprous chloride which is one of the products. When treated with ammonia and then boiled, the chloride remains in solution but may be recovered by adding caustic alkali or alkali carbonate. In the apparatus shown in the illustration, the crushed ore is fed from a hopper A to a drier B, which is heated internally by the combustion of gas from the reducing furnace C. A rotary furnace C is used and is heated externally. The ore is then transferred by a conveyor D to a leaching apparatus E, from which the solution passes to a tank H. A centrifugal pump J circulates the ammoniacal liquor through the vessels F, E, H, when the valve K is open, or the fully charged solution may be delivered through a valve L to a still M, where the ammonia is removed by steam from the superheater N, while the ammonia is recovered in a condenser P and collected in a tank Q for return to the system.



185,327. Rotary Kilns. O. Faber, Valhalla, Farthing Down, Coulsdon, Surrey, and H. V. A. Briscoe, Armstrong College, Newcastle-on-Tyne, Northumberland. Application date, September 5, 1921.

Rotary kilns such as are used for the manufacture of Portland cement are usually covered with heat insulating material, but this may involve overheating of the steel shell due to lack of radiation. In this invention, the overheating is avoided by applying the insulating material in the form of plates which are attached directly to the shell by set-screws or plugs of fusible metal having a melting point such that the plates are detached if the temperature of the shell rises above 800° F. The thickness of the insulating plates and their heat conductivity are determined by calculation and/or experiment, to give the required insulation without overheating. Plates of less thickness and/or greater conductivity may be used on the hotter parts of the kiln than on the cooler parts, and the thickness and/or conductivity may be varied along the length of the kiln.

D

185,374. CRYSTALLINE TITANIUM OXIDE, PROCESS OF PRODUCING. G. Carteret, 68, Rue Escudier Boulogne-sur-Seine (Seine), France, and M. Devaux, 55, Rue de Rome, Paris. Application date, June 27, 1921.

In the usual process for treating titanium ore (rutile or titanic iron) with strong acids, alkali sulphates or carbonates, to prepare titanium oxide, it is found difficult to eliminate the iron. In the present invention titanium chloride free from iron is first prepared according to the process described in Specification No. 184,948 (see THE CHEMICAL AGE, Vol. VII., page 461), dissolved in water, and the solution neutralised with a carbonate, alkaline oxide or alkaline earth, when the titanium oxide coagulates. The gelatinous material is separated, dissolved in a 25 per cent. solution of sulphuric acid, and the solution boiled to precipitate the amorphous oxide. This precipitation is facilitated by a slight hydrogenation which may be effected by adding a small quantity of zinc to yield nascent hydrogen. The amorphous oxide is calcined to produce the crystalline oxide.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention:—167,171 (Zellstofffabrik Waldhof, C. Hangleiter, and H. Clemm) relating to recovery of sulphurous acid and heat from the waste gases from pulp boilers, see Vol. V., p. 412; 176,770 (G. A. Blanc), relating to separation of chlorides of aluminium and potassium from mixed solutions obtained in the treatment of leucite, see Vol. VI., p. 635.

International Specifications not yet Accepted

183,823. DISTILLING SHALE. L. Kern, 1, Liebherrstrasse, Munich, Germany. International Convention date, July 27, 1921.

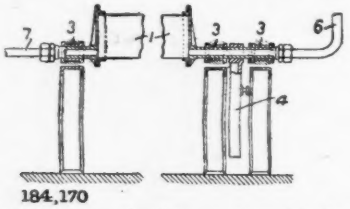
Shale is ground and formed into briquettes, which are arranged in a retort with intervening air spaces. The retort is slowly heated to 700° C., and the oil vapour is readily liberated into the air spaces. Fusion of the flux-forming constituents in the shale is prevented by the slow heating. Air is then admitted to the retort and the temperature raised to 1050° C., yielding a porous product which may be used as a substitute for kieselguhr for insulating purposes. Peat or sawdust may be incorporated with the shale before distillation, and also magnesium chloride or other chloride which yields acid.

184,153. HYDROGEN PEROXIDE. Chemische Fabrik Weissenstein Ges., Weissenstein a Drau, Kärnten, Carinthia, Austria. International Convention date, August 3, 1921.

Apparatus made of tantalum is used in producing, distilling or concentrating hydrogen peroxide.

184,170. DISTILLING TAR. Verein für Chemische und Metallurgische Produktion, Aussig, Czecho-Slovakia. International Convention date, August 5, 1921.

Tar is supplied continuously through a pipe 6 and hollow trunnions 3 to a vessel 1 which is heated internally or externally. The vessel is weighted by a counterweight 4 and is oscillated



184,170

during the distillation. Frothing and overheating are thereby prevented. The vessel 1 may be slightly inclined towards the outlet, and the vapour drawn off is fractionally condensed and may then be fractionally distilled in a similar apparatus.

LATEST NOTIFICATIONS.

186,316. Process of removing sulphuretted hydrogen from gases. Ges. für Kohlentechnik. September 20, 1921.

186,329. Purifying distillation apparatus for continuous production. Parodi, P. September 21, 1921.

186,336. Bronze alloys and processes for their production. Allgemeines Deutsches Metallwerk Ges. September 20, 1921.

186,337. Copper and zinc alloys and processes for the production thereof. Allgemeines Deutsches Metallwerk Ges. September 21, 1921.

Specifications Accepted, with Date of Application

161,537. Copper alloys, Treatment of. Isabellen-Hutte Ges April 10, 1920.

161,581. Sulphurous acid, Process for the manufacture of. Rhenania Verein Chemischer Fabriken Akt.-Ges. April 14, 1920.

165,724. Retorts for distillation. Deutsche Petroleum Akt.-Ges., S. Kacser, E. Bauer. July 3, 1920.

167,769. Ammonium chloride, Treatment of. A. Riedel. August 13, 1920.

185,779. Mineral and other oils, Process for the manufacture of oily pastes or emulsions from. Plauson's (Parent Co.), Ltd. (*H. Plauson.*) April 6, 1921.

185,780. Gas purification, Process and apparatus for. K. Cox, R. P. Kerr, E. J. Baty. April 7, 1921.

185,782. Hydrocarbon oils and other oils and fats, Process of increasing the consistency of. H. Meyer zu Eissen and P. Kiederich. April 12, 1921.

185,784. Furnaces. J. Reid. April 12, 1921.

185,808. Electrolytic refining of tin, Process for. W. P. Thompson. (*W. J. Aikens.*) May 31, 1921.

185,811. Recuperative coke-ovens. E. Piron. June 2, 1921.

185,842. Metalliferous materials containing tungsten or molybdenum, Electrolytic treatment of. R. E. Pearson, E. N. Craig, and Durelco, Ltd. June 11, 1921.

185,859. Matte and other materials and solutions containing copper and nickel, Treatment of. H. G. C. Fairweather. (*N. V. Hybinette and R. L. Peek.*) June 15, 1921.

185,873. Evaporators and distilling apparatus. Blair, Campbell and McLean, Ltd., and J. L. Ferguson. June 23, 1921.

185,878. High speed disintegrators. Plauson's (Parent Co.), Ltd. (*H. Plauson.*) June 25, 1921.

185,880. Direct dyeing cotton colours, Manufacture and production of. British Dyestuffs Corporation, Ltd., J. Baddiley, J. B. Paymen and E. G. Bainbridge. June 28, 1921.

185,887. Carburetted water-gas, blue water-gas, methane-hydrogen, and producer gas, Apparatus and process for the manufacture of. E. F. Murray. July 1, 1921.

185,913. Amino-alcohols of the quinoline series, Manufacture of. O. Y. Imray. (*Society of Chemical Industry in Basle.*) July 20, 1921.

185,980. Gas producers. W. Climie. June 15, 1921.

Applications for Patents

Akt.-Ges. für Anilin-Fabrikation and Bloxam, A.G. Manufacture of tetratrisazo dye-stuffs. 26116. September 27.

Brewer, G., and Krupp Akt.-Ges. Process for electrolytic separation of pure chromium in thick layers. 26206. September 28.

British Dyestuffs Corporation, Ltd., Green, A.G., and Saunders, K. H. Manufacture of azo dye-stuffs. 25989. September 26.

Campbell, D. F. Reduction of metallic oxides and ores in melting furnaces. 26470. September 30.

Dodd, H., Sprent, W. C., and United Alkali Co., Ltd. Manufacture of para-di-chlor-benzene and chlor-anthraquinone. 26343. September 29.

Duplan, F. Process for distributing tars. 26108. September 27. (France, September 29, 1921).

Hargraves, C. M. Means for filtering liquids. 25899. September 25.

Hoare, W. E. Process for manufacture of vegetable casein or albumen. 26340. September 29.

Lewis, G. P. Molecular conversion of hydrocarbons and separation of resultant products. 26114. September 27.

Masters, C. L. Manufacture of β-naphthol 2 : 3 : 6 and 2 : 6 : 8 disulphonic acids. 26021. September 27.

Masters, C. L. Process for separation of isomeric naphthylamine sulpho acids. 26022. September 27.

Masters, C. L. Process for manufacture of α and β naphthols. 26023. September 27.

Naugatuck Chemical Co. and Rushen, P. C. Vulcanisation of rubber. 25972. September 26.

New Jersey Zinc Co. Manufacture of lithopone. 25909. September 25. (United States, November 2, 1921.)

Nitrogen Corporation. Synthesising ammonia. 26000. September 26. (United States, October 5, 1921.)

Plauson, H., and Plauson's (Parent Co.), Ltd. Paints. 25813. September 25.

Plauson, H., and Plauson's (Parent Co.), Ltd. Manufacture of lubricants. 26276. September 29.

Plauson, H., and Plauson's (Parent Co.), Ltd. Production of cement from oil shale and simultaneous recovery of shale oil. 26189. September 28.

Rawson, W. S. Treatment of hydromagnesite. 25983. September 26.

Robinson, H. W. Treatment of asphaltic base oils, bituminous products, and tar. 25870. September 25.

Sobotka, H., and Willstätter, R. Production of yeast preparations for food. 25895. September 25.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to* THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

LONDON, OCTOBER 5, 1922.

THE improvement in trade mentioned in our last issue is maintained and there is quite a cheerful feeling in some markets.

The volume of business placed is better and prices on the whole continue very firm.

Export although remaining quiet has been slightly better than has been the case of late.

General Chemicals

ACETONE is practically unobtainable on the spot, and it is very difficult to obtain even forward quotations.

ACID ACETIC maintains its advance, and a shortage is being experienced for some qualities.

ACID CITRIC is without feature, and favours buyers.

ACID FORMIC is steady, with a good business to report.

ACID LACTIC has been in better demand, and the price is very firm.

ACID TARTARIC continues slow, with business distinctly on the light side.

BARIUM CHLORIDE is less interesting, although there have been some export orders in the market.

COPPER SULPHATE has been stagnant, with little business of note in evidence.

CREAM OF TARTAR is a bright spot, especially on export account, and the price is well maintained.

FORMALDEHYDE is scarce and firm, and looks like advancing further.

IRON SULPHATE is without change.

LEAD ACETATE is firming up, especially in view of the higher prices asked from the Continent.

LEAD NITRATE is a poor market, and business is of the hand-to-mouth variety.

LIME ACETATE is firmly held, although buyers are adopting a cautious attitude in regard to their immediate purchases.

LITHOPONE is in good request.

MAGNESIUM CHLORIDE is nominally unchanged, but there are very frequent offers from the Continent.

METHYL ALCOHOL is almost unobtainable for near delivery, and the price tends upwards.

POTASSIUM CARBONATE is only in quiet demand, and prices are nominally unchanged.

POTASSIUM CAUSTIC is a poor market, but without change in value.

POTASSIUM CHLORATE continues in fair demand, and price is firm.

SODIUM ACETATE continues scarce, and an advance in price is not unexpected.

SODIUM HYPOSULPHITE has been fairly active and British makers have made a very small reduction to meet Continental competition. Prices can now only be considered extremely cheap.

SODIUM NITRITE has been in better request, and the price has advanced.

SODIUM PHOSPHATE has been a better market, although the value is nominally unchanged.

SODIUM PRUSSIATE is without change, and is as scarce and firm as ever.

ZINC OXIDE is very firm, with plenty of inquiry in evidence.

Coal Tar Intermediates

Business has been a little better and some consumers are inclined to consider placing forward business.

ALPHANAPHTHOL has been in better request, especially on export account.

ALPHANAPHTHYLAMINE is distinctly on the mend and quite a good business is reported.

ANILINE OIL is fairly steady on home trade account.

BETANAPHTHOL has been in better request and re-sellers' quotations are now approximating those of makers.

BETANAPHTHYLAMINE is idle.

DIMETHYANILINE is firmer and an advance is not unexpected.

DIPHENYLAMINE is scarce and firm.

"G" SALT is without demand.

"H" ACID has not been so active and there are better sight supplies.

NAPHTHIONIC ACID is in small request.

NITROBENZOL is quieter and the price is easy.

PARANITRANILINE is called for.

RESORCIN.—A few orders have been in evidence.

XYLIDINE has been quiet and easy.

Coal Tar Products

The markets generally are firm, but while some articles show an upward tendency, others have been affected by special conditions which have arisen quite recently.

90's BENZOL.—The supply is by no means plentiful, and prices are fairly well maintained. There is, however, a feeling of insecurity, and buyers are not disposed to operate except from hand to mouth. To-day's price is 1s. 11d. to 2s. per gallon on rails.

PURE BENZOL.—There is some inquiry for export, but the price of 2s. 4d. per gallon at works appears to be unattractive to buyers.

CREOSOTE OIL still remains very scarce, and for prompt delivery there are buyers at 5¾d. per gallon, while sellers ask 6d. per gallon on rails in the North, and a halfpenny to three-farthings more in the South.

CRESYLIC ACID.—The market for this article is quite unsettled owing to the new American Tariff, and business is extremely limited. There is, however, very little change in the quotations.

SOLVENT NAPHTHA is quite steady, and there appear to be no sellers at under 1s. 10d. to 1s. 11d. per gallon.

HEAVY NAPHTHA is quiet, without change.

NAPHTHALENE.—There is some inquiry for crude, but the market is still somewhat inactive.

PITCH.—Prompt parcels remain scarce, and high prices are being paid for lots available for early shipment, but owing to the slow demand in South Wales, prices are somewhat irregular. To-day's quotations are 95s. to 97s. 6d. f.o.b. East Coast, and 97s. 6d. to 100s. f.o.b. London.

Sulphate of Ammonia

There is no change in the price for October, but the figure for the home trade for November/December has been fixed at 5s. per ton advance.

Current Prices

Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	8	to	0	1	10
Acetone oil	ton	80	0	0	to	82	10	0
Acetone, pure	ton	105	0	0	to	110	0	0
Acid, Acetic, glacial, 99–100%	ton	67	0	0	to	68	0	0
Acetic, 80% pure	ton	47	0	0	to	48	0	0
Arsenic, liquid, 2000 s.g.	ton	67	0	0	to	70	0	0
Boric, cryst.	ton	60	0	0	to	65	0	0
Carbolic, cryst. 39–40%	lb.	0	0	6	to	0	0	6½
Citric	lb.	0	2	2	to	0	2	3
Formic, 80%	ton	57	10	0	to	60	0	0
Gallic, pure	lb.	0	2	11	to	0	3	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	40	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	44	0	0
Nitric, 80 Tw.	ton	30	0	0	to	31	0	0
Oxalic	lb.	0	0	7¾	to	0	0	8
Phosphoric, 1.5	ton	38	0	0	to	40	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, Technical	lb.	0	0	10½	to	0	1	0
Salicylic, B.P.	lb.	0	1	5	to	0	1	6
Sulphuric, 92–93%	ton	7	10	0	to	8	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	4½	to	0	1	5

	Per	£	s.	d.		£	s.	d.
Alum, lump	ton	10	0	0	to	10	10	0
Alum, chrome	ton	28	0	0	to	29	0	0
Alumino ferric	ton	9	0	0	to	9	5	0
Aluminium, sulphate, 14–15%	ton	10	10	0	to	11	0	0
Aluminium, sulphate, 17–18%	ton	11	10	0	to	12	0	0
Ammonia, anhydrous	lb.	0	1	8	to	0	1	9
Ammonia, .880	ton	33	0	0	to	35	0	0
Ammonia, .920	ton	21	0	0	to	23	0	0
Ammonia, carbonate	lb.	0	0	4	to	0	0	4½
Ammonia, chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate (pure)	ton	35	0	0	to	40	0	0
Ammonia, phosphate	ton	70	0	0	to	72	0	0
Ammonia, sulphocyanide	lb.	0	1	10	to	0	2	0
Amyl acetate	ton	175	0	0	to	185	0	0
Arsenic, white, powdered	ton	46	0	0	to	47	0	0
Barium, carbonate, 92–94%	ton	15	0	0	to	16	0	0
Barium, Chlorate	ton	65	0	0	to	70	0	0
Barium Chloride	ton	22	0	0	to	22	10	0
Nitrate	ton	27	10	0	to	30	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	1	0	to	0	1	3
Bleaching powder, 35–37%	ton	12	0	0	to		—	
Borax crystals	ton	29	0	0	to	33	0	0
Caffein	lb.	0	13	6	to	0	14	6
Calcium acetate, Brown	ton	10	10	0	to	11	10	0
" " Grey	ton	15	10	0	to	16	0	0
Calcium Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	6	0	0	to		—	
Carbon bisulphide	ton	50	0	0	to	52	0	0
Casein technical	ton	47	0	0	to	55	0	0
Cerium oxalate	lb.	0	4	6	to	0	4	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	2	to	0	1	3
Sulphate	ton	26	10	0	to	27	0	0
Cream Tartar, 98–100%	ton	108	0	0	to	110	10	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	74	0	0	to	76	0	0
Formusol (Rongalite)	lb.	0	2	6	to	0	2	9
Glauber salts, commercial	ton	5	0	0	to	5	10	0
Glycerine, crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	5	to	0	2	6
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	41	0	0	to	42	0	0
Carbonate (White Lead)	ton	43	0	0	to	47	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	23	10	0	to	24	0	0
Magnesium chloride	ton	7	0	0	to	7	10	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	8	0	0	to	8	10	0
Sulphate (Druggists')	ton	13	10	0	to	14	10	0
Manganese, Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	60	0	0	to	62	0	0
Methyl acetone	ton	70	0	0	to	75	0	0
Alcohol, 1% acetone	ton	70	10	0	to	75	0	0
Nickel sulphate, single salt	ton	49	0	0	to	51	0	0
Ammonium sulphate, double salt	ton	51	0	0	to	52	0	0
Potash, Caustic	ton	33	0	0	to	34	0	0
Potassium bichromate	lb.	0	0	6½	to		—	
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride, 80%	ton	12	0	0	to	12	10	0
Chlorate	lb.	0	0	4½	to	0	0	5
Metabisulphite, 50–52%	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	45	0	0	to	47	0	0
Permanganate	lb.	0	0	8½	to	0	0	9½
Prussiate, red	lb.	0	4	6	to	0	4	9
Prussiate, yellow	lb.	0	1	7	to	0	1	8
Sulphate, 90%	ton	13	0	0	to	13	10	0
Salammoniac, firsts	cwt.	3	3	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	24	10	0	to	24	15	0
Arseniate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	5	to		—	
Bisulphite 60–62%	ton	23	0	0	to	24	0	0
Chlorate	lb.	0	0	3½	to	0	0	4
Caustic, 70%	ton	20	10	0	to	21	0	0
Caustic, 76%	ton	21	10	0	to	22	10	0
Hydrosulphite, powder, 85%	lb.	0	1	9	to	0	2	0
Hyposulphite, commercial	ton	12	10	0	to	13	10	0
Nitrite, 96–98%	ton	29	10	0	to	30	0	0
Phosphate, crystal	ton	16	10	0	to	17	0	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	11½	to	0	1	0
Sulphide, crystals	ton	12	10	0	to	13	10	0
Sulphide, solid, 60–62%	ton	21	10	0	to	23	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	55	0	0	to	60	0	0
Strontium Nitrate	ton	50	0	0	to	55	0	0
Strontium Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	13	0	0	to	14	0	0
Roll	ton	13	0	0	to	14	0	0
Tartar emetic	lb.	0	1	4	to	0	1	5
Theobromine	lb.	0	12	6	to	0	13	0
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	5	to	0	1	6
Zinc chloride 102° Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	36	0	0	to	38	0	0
Dust, 90%	ton	45	0	0	to	47	10	0
Sulphate	ton	18	10	0	to	19	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	2	3	to	0	2	6
Alphanaphthol, refined	lb.	0	3	0	to	0	3	3
Alphanaphthylamine	lb.	0	2	0	to	0	2	1
Aniline oil, drums extra	lb.	0	1	0	to	0	1	1
Aniline salts	lb.	0	1	0	to	0	1	1
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	6	to	0	4	0
Benzidine, base	lb.	0	5	3	to	0	5	6
Benzidine, sulphate	lb.	0	5	3	to	0	5	6
Benzoic acid	lb.	0	1	9	to	0	2	0
Benzoate of soda	lb.	0	1	7½	to	0	1	9
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	4	9	to	0	5	0
Betanaphthol	lb.	0	1	4	to	0	1	4½
Betanaphthylamine, technical	lb.	0	5	0	to	0	5	6
Croceine Acid, 100% basis	lb.	0	3	6	to	0	3	9
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	2	9	to	0	3	0
Dinitrobenzol	lb.	0	1	3	to	0	1	4
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	5	to	0	1	6
Dinitrophenol	lb.	0	1	9	to	0	2	0
Dimethylaniline	lb.	0	2	6	to	0	2	9
Diphenylamine	lb.	0	4	3	to	0	4	6
H-Acid	lb.	0	6	3	to	0	6	9
Metaphenylenediamine	lb.	0	4	9	to	0	5	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	6	0	to	0	6	6½
Metatoluylenediamine	lb.	0	4	6	to	0	4	9
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	3	0	to	0	3	3
Naphthionate of Soda	lb.	0	3	0	to	0	3	3
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitrobenzol	lb.	0	0	9	to	0	0	9½
Nitronaphthalene	lb.	0	1	3	to	0	1	4
Nitrotoluol	lb.	0	1	0	to	0	1	2
Orthoamidophenol, base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	1	6	to	0	1	9
Orthonitrotoluol	lb.	0	0	8	to	0	0	10
Para-amidophenol, base	lb.	0	9	0	to	0	9	6
Para-amidophenol, hydrochlor	lb.	0	8	6	to	0	9	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	6	to	0	3	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	5	0	to	0	5	3
Paraphenylenediamine, distilled	lb.	0	10	6	to	0	10	9
Paratoluidine	lb.	0	6	0	to	0	6	6
Phthalic anhydride	lb.	0	2	9	to	0	3	0
Resorcin, technical	lb.	0	4	6	to	0	5	0
Resorcin, pure	lb.	0	6	9	to	0	7	0
Salol	lb.	0	2	0	to	0	2	3
Sulphanilic acid, crude	lb.	0	1	0	to	0	1	1
Tolidine, base	lb.	0	6	6	to	0	7	0
Tolidine, mixture	lb.	0	2	6	to	0	2	9

French Potash Production

ACCORDING to the *Journèe Industrielle* the output of potash in France during the second quarter of this year showed an improvement on that for the first quarter, the respective figures in tons of pure potash (K_2O) being 46,282 and 38,733.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

GLASGOW, OCTOBER 4, 1922.

THERE was practically no change in the chemical market during the past week, and there is nothing of importance to record.

Industrial Chemicals

ACID ACETIC.—Glacial 98/100% quotations vary from £58 to £65 per ton; 80% technical, £38 to £39 per ton; 80% pure, £43 to £45 per ton.

ACID BORACIC.—Prices unchanged; crystal or granulated, £60 per ton; powdered, £62 per ton.

ACID CARBOLIC.—Crystals, 6½d. to 6¾d. per lb.

ACID FORMIC.—Offered at £58 per ton.

ACID HYDROCHLORIC.—Still in poor demand. Price 6s. 6d. per carboy, ex works.

ACID OXALIC.—About 7¾d. per lb.

ACID SULPHURIC.—144°, £4 per ton; 168°, £7 5s. per ton; ex works; de-arsenicated quality, £1 per ton more.

ACID TARTARIC.—Quoted 1s. 3½d. per lb.

ALUM LUMP POTASH.—Spot lots £15 10s. per ton.

ALUM CHROME.—Offered at £28 10s. per ton, f.o.b., Continental port.

AMMONIA CARBONATE.—Lump, 4d. per lb.; ground, 4½d. per lb. delivered.

AMMONIA MURIATE.—Galvanisers' grey quality offered at £26 per ton, c.i.f. U.K.; fine white crystals, £24 per ton, c.i.f. U.K.

AMMONIA SULPHATE.—25¼%, £14 15s. per ton; 25¾%, neutral, £15 18s. per ton, ex works, October delivery. Higher prices for export.

ARSENIC, WHITE POWDERED.—In fair demand. Price about £48 per ton, ex quay.

BARIUM CHLORIDE.—On offer from Continent at about £19 per ton, c.i.f. U.K.

BARYTES, FINEST WHITE.—£5 5s. per ton, ex English works. Moderate inquiry for grey quality, price £3 17s. 6d. per ton ex works.

BLEACHING POWDER.—Price unchanged, £12 15s. per ton, ex station, spot delivery.

BORAX.—Crystal or granulated, £29 per ton; powder, £30 per ton, ex station.

CALCIUM CHLORIDE.—English make, £6 per ton, ex station; Continental material slightly cheaper.

COPPERAS, GREEN.—Offered at £3 15s. per ton, ex works.

FORMALDEHYDE, 40%.—Quoted £67 to £68 per ton, ex wharf.

GLAUBER SALTS.—About £4 to £5 per ton, according to quality.

LEAD.—Red, £37 15s. per ton; white, £49 15s. per ton delivered U.K. Continental make of red lead offered at £32 10s. per ton, c.i.f. U.K.

MAGNESITE, FINEST CALCINED.—Offered at £10 per ton spot delivery.

MAGNESIUM CHLORIDE.—Spot lots about £5 10s. per ton. Offered for forward delivery at £4 15s. per ton, c.i.f.

MAGNESIUM SULPHATE (EPSOM SALTS).—Commercial quality, £7 5s. per ton; B.P. quality, £9 per ton.

POTASSIUM BICHROMATE.—Makers' price unchanged at 6½d. per lb., delivered.

POTASSIUM CARBONATE.—90/92% quoted £29 per ton; 96/98% £32 per ton, ex store.

POTASSIUM CHLORATE.—Offered at 4½d. per lb., delivered.

POTASSIUM CAUSTIC, 88/92%.—Spot lots about £29 per ton, ex store.

POTASSIUM NITRATE (SALTPETRE).—Price for spot delivery about £32 per ton.

POTASSIUM PRUSSIATE.—Price now about 1s. 7d. per lb., delivered.

ODIUM ACETATE.—On offer at £24 per ton.

SODIUM BICARBONATE.—Refined quality £10 10s. per ton, ex station; m.w. quality, £1 less.

SODIUM BICHROMATE.—Makers' price unchanged, 5d. per lb., delivered.

SODIUM CARBONATE (SODA CRYSTALS).—Price £5 10s. to £5 15s. per ton, ex quay.

SODIUM CARBONATE (ALKALI 58%).—Price for spot delivery £8 16s. 6d. per ton, ex station.

SODIUM CAUSTIC.—76/77%, £23 5s. per ton; 70/72% £21 5s. per ton; 60% broken £24 per ton; powdered, 98/99% £26 15s. to £27 15s. per ton, ex station. Moderate demand for export.

SODIUM HYPOSULPHITE.—Commercial crystals, £12 10s. per ton; pea crystals, £18 per ton.

SODIUM NITRATE.—Refined quoted £12 10s. per ton, f.o.b. U.K.

SODIUM NITRITE.—Price £31 per ton delivered, basis 100%.

SODIUM SILICATE, 140°.—Offered for export at £11 per ton.

SODIUM SULPHATE (SALTCAKE 95%).—Price for home consumption £4 per ton on contract.

SODIUM SULPHIDE, 60/62% CONC.—Continental, £16 per ton, c.i.f. U.K.; 30/32% crystals, £9 per ton c.i.f. U.K.

SULPHUR.—Government surplus stocks of Sicilian thirds at £3 15s. per ton, ex depot; flowers, £13 per ton; roll, £12 per ton; ground, £11 per ton; rock, £11 per ton; prices nominal.

ZINC CHLORIDE.—Offered at £23 per ton ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHYLAMINE.—Good demand for the home market. Price about 1s. 10d. per lb.

ANILINE OIL.—Prices remain firm. Home, 11½d. delivered, returnable drums; export, 1s. 0½d., f.o.b., drums included.

BENZIDINE BASE.—Export inquiries. Price quoted, 6s. 6d. per lb. 100% basis, f.o.b.

"G" ACID.—Home inquiry. Price quoted, 3s. 6d. per lb., 100% basis.

"H" ACID.—Home inquiry; price 6s. per lb., 100% basis, delivered.

PARA AMIDO PHENOL HYDROCHLORIDE.—Home inquiries. Price quoted, 8s. 8d. per lb. carriage paid.

PARANITRANILINE.—Export inquiry. Price quoted, 3s. 6d. per lb. f.o.b.

PARAPHENYLENEDIAMINE BASE.—Home inquiries. Price quoted, 15s. per lb. delivered.

West Cumberland Chemists' Association

STARTED last year in a very modest manner, the West Cumberland Association of Chemists, Chemical and Metallurgical Engineers, which meets at the Technical College, Workington, has quickly attracted notice, and now has a membership of one hundred. Mr. G. J. Valentine is president for 1922-3, and the other officers include Messrs. G. J. Denbigh (vice-president), L. Wyld (hon. treasurer), and D. R. Wattleworth, Windsor Lodge, Moresby (hon. secretary). The syllabus for the winter session includes a paper on "Some Theoretical Aspects of the Manufacture of Sulphuric Acid," by Mr. C. Irwin, and other papers and discussions on iron ore; coal washing; industrial wastes; steel melting furnaces; the origin and distribution of salinity in rain and river water; and mechanical lubrication.

Institute of Metals Programme

AN interesting collection of papers is included in the programme of meetings of the Institute of Metals and its local sections for the session 1922–23. From this we note that the North-East Coast Section appears in the programme for the first time, and we understand that as a result of the success of the meeting held at Swansea recently, steps are being taken to form a South Wales Section in that town. It is pointed out that prospective members are allowed to attend meetings of the Institute and of its local sections on application being made to the Secretary, at 36, Victoria Street, London, S.W.1, with a view to their election in connection with the next ballot, which takes place on December 14 next. Dr. W. Rosenhain, F.R.S., has been chosen to deliver the annual May lecture.

The Manchester Chemical Market

FROM OUR OWN CORRESPONDENT.

Manchester, October 5, 1922.

THE chemical trade here has taken on a healthier tone again, though any improvement has been chiefly in respect of the home branch, purchasers on foreign account not showing any marked increase of buying interest. Continental trade, in particular, is a very quiet section, export business being confined principally to shipments to Colonial markets. It is early yet to say much as to the effect of the new United States tariff on the British export chemical trade, but there is a general belief here that it must inevitably result in a reduction in the volume of shipments to America.

Short-time working in the Lancashire cotton trade has restricted the consumption of textile chemicals, but not sufficiently to affect the general position, paper makers and the iron and steel trades absorbing fair quantities. Meanwhile prices on the whole are firmly maintained. Here and there a slight shading of quotations is noticeable, but this is neutralised by added strength in other lines.

Heavy Chemicals

Caustic soda maintains its firm position, and offers stand at £20 5s. for 60 per cent. material, and £23 5s. per ton for 76 per cent.; there is a fairly regular demand from home users, and on export account also there is a moderately steady inquiry, mainly for shipment to the Colonies. Soda crystals are steady at £5 12s. 6d. per ton, delivered. Bleaching powder is in fair request both for home consumption and for shipment; price is £12 10s. per ton, in softwood casks at makers' works. Saltcake is quiet at £4 5s. per ton, buyers calling for supplies in moderate bulk. Soda bicarbonate keeps steady at £10 10s. per ton, in 2-cwt. bags. Ammonia alkali, 58 per cent. material, is still quoted at £7 17s. 6d. to £8 10s. per ton, in bags, to home consumers, but the demand is rather quiet. Hyposulphite of soda is inactive, photographic quality being a shade easier at £17 15s. and commercial £11 15s. per ton. Sodium sulphide is quiet at £20 per ton for 60–65 per cent. material. Nitrite of soda is in slightly better inquiry at £28 10s. per ton. Glauber salts remain a rather quiet market, though the price is unchanged at £4 10s. per ton. The demand for acetate of soda is a shade better at about £23 10s. per ton. Chlorate of soda is in good supply and meets with a moderately active demand at 3d. per lb. Prussiate of soda is still scarce and offers are firm at 11d. per lb., supplies being readily taken up. Phosphate of soda is very quiet at £15 10s. per ton.

Among the products of the potash group, caustic is just a shade easier, though sellers still meet with a fairly active inquiry; 88–90 per cent. strength is now quoted at about £28 per ton, and 75–80 per cent. at £23 10s. The demand for carbonate is improving a little at £28 10s. per ton for 90–92 per cent. material. Bichromate of potash is fairly active, but prices are unchanged at about 6½d. per lb. Supplies of prussiate of potash are short and prices firm at 1s. 6d. per lb. for yellow, and 4s. to 4s. 3d. for red. Chlorate of potash is rather more active at 4¼d. per lb. Commercial permanganate is in quiet demand at 7½d. to 7¾d. per lb.

There is no expansion to be noted in the inquiry for sulphate of copper, and the price is weak at about £26 per ton. Arsenic keeps scarce and prices are firm, white powdered, Cornish makes, being quoted at last week's range of £47 to £48 per ton. Chloride of barium is still in moderate demand at about £19 10s. per ton. Commercial Epsom salts are quiet but unchanged at £6 to £6 5s. per ton. Acetate of lime is still scarce both for prompt and forward delivery; £14 10s. is asked for grey material and £8 10s. for brown. White sugar of lead is quiet but steady at £38 and brown £34, with Continental supplies on offer at lower rates. Flake litharge is still moderately active at up to £38 per ton. Nitrate of lead, British make, is quiet at about £43 10s. Ammonium muriate, grey, is in slightly improved demand for home consumption at £35 per ton: white is £40.

Acids and Tar Products

Tartaric and citric acids remain a quiet market, the former still being quoted at 1s. 3d. and citric 2s. per lb. for B.P. quality. Acetic acid is steady, glacial at £65 and 80 per cent. technical at £39 per ton. Oxalic acid is unchanged at 7¼d. to 7½d. per lb.

Tar distillation products are a shade weaker in some sections, though the general position may be described as firm. Pitch is in good demand by foreign users and prices are stronger, £4 5s. to £4 7s. 6d. per ton, f.o.b. Manchester, being freely quoted. Carbolic acid crystals are not too plentiful, and with an active inquiry the price is firm at 6¾d. per lb. Crude carbolic acid brings about 2s. per gallon. There is no improvement in solvent naphtha, and 1s. 11d. per gallon is still to-day's average quotation. Creosote oil is firm at 6d. per gallon, supplies going readily into consumption. Benzol is also very steady at 1s. 11d. to 2s. per gallon. Naphthalene is quiet, but prices are unchanged at £16 for flake and about £4 15s. for crude.

The Ceramic Society

Autumn Meeting of Refractories' Section

THE autumn meeting of the members of the Refractory section of the Ceramic Society was held in Birmingham on Tuesday. In the evening members dined at the Grand Hotel, under the presidency of Lieut.-Col. C. W. Thomas. Professor T. Turner, of the Chair of Metallurgy at the University of Birmingham, proposed the toast of the section. Few people realised, he said, the importance of the ceramic industry, It was astonishing to see to what different purposes clay in some form or other was applied. Clay was a very complex substance. It varied very much in composition and underwent remarkable changes during the process of manufacture. It was necessary therefore that we should have scientific knowledge in connection with the development of the industry.

Lieut.-Col. Thomas acknowledged the toast, observing that a general utility and general value to other industries of the country, the lines of possible development which the section opened out were certainly of equal moment to what the other branches of the Society were able to offer, and he should be glad to see a greater membership of, and a more active interest in, the work of the British Refractories' Research Association on the part of those whose lot it was to use refractory materials. Research was one of the most vital necessities of the industry at the present time—more important than in many others that had much more flourishing research associations. The future would be in the hands of those who were prepared to turn out what practically amounted to a guaranteed product. It was important, too, that there should be systematic education and training on organised lines.

The toast of "The Visitors" was proposed by Sir W. J. Jones and Mr. E. M. Myers (president of the Coke Oven Managers' Association) replied.

The Nitrate Market

IN their monthly report on nitrate of soda, Henry Bath and Son, Ltd., state that deliveries during September from European ports amounted to about 43,000 tons, against 13,000 tons a year ago. During the past month the market has been quiet and fluctuations in exchanges have continued to hamper business in Continental markets. Spot nitrate has changed hands at the parity of £11 10s. to £11 15s. and spring delivery at the parity of £12 to £12 5s. per ton delivered, which are the nearest values at the close. Liner parcels have been sold at £11 10s. c.i.f. for early arrival and £11 12s. 6d. for September shipment, while £11 15s. c.i.f. is asked for October shipment. Business is reported up to £12 5s. c.i.f. for shipment during the next month or so to the Mediterranean. A considerable business continues to be done in nitrate f.a.s. Chile, and sales by the Association during September amount to over 100,000 tons. Total sales to date for delivery from July, 1922, onwards amount to over, 900,000 tons.

Production in Chile during August was 95,000 tons, and the output this month is likely to be on about the same level. This figure compares with a monthly output at the beginning of the year of less than 70,000 tons, and the rate seems to be rising faster than is justified by the outlook. Freights have ruled somewhat lower, with fixtures of October-November steamers reported down to 30s. per ton. At the close the tone is a trifle steadier, owing to an improvement in the River Plate market.

Company News

RECKITT AND SONS.—An interim dividend of 8d. per share, less tax, is payable on the ordinary shares for the past quarter.

SALT UNION, LTD.—An extraordinary general meeting of the holders of the "B" debenture stock will be held at Colonial House, Liverpool, on October 12, at 3 p.m.

MAZAPIL COPPER CO.—Shareholders are advised by the chairman to refrain from giving the option on their shares asked for by the Consolidated Gold Fields of South Africa, Ltd., and Messrs. Eilers and Finney, of New York.

WHITEHAVEN HEMATITE IRON AND STEEL CO., LTD.—Owing to the past trade depression the directors announce that they do not feel justified in paying the dividend on the 7 per cent. preference shares for the half year ended September 30.

BELL'S UNITED ASBESTOS CO., LTD.—The directors have declared an interim dividend on the ordinary shares of sixpence per share, less income tax, on account of the profits of the current year. The dividend will be paid on October 23 to shareholders on the register on October 7, and the ordinary share transfer books will be closed from to-day (Saturday) to October 20.

THORNCLIFFE COAL DISTILLATION, LTD.—The directors report, after making the usual allowance for depreciation, there is a loss of £33,531 on the year. Preference dividends absorbed £11,013, and £6,895 was brought in, leaving a debit balance of £37,649 to be carried forward. The directors state that the prospects are brighter, and a speedy recovery is anticipated.

HARGREAVES BROTHERS AND CO.—The accounts for 1921 show that after paying all expenses of management, providing £14,573 for financial charges, including a credit balance of £1,187 brought in, and transferring £2,454 from reserve to profit and loss account, a debit balance of £121,740 remains to be carried forward. A dividend on the preference shares for the first two quarters of year was paid out of reserve, but is in arrear from July 1, 1921.

BORAX CONSOLIDATED, LTD.—A dividend is announced at the rate of 6 per cent. per annum, less tax, at 5s. in the £ on the preferred ordinary shares in respect of the half-year to September 30 last. Coupon No. 30 of bearer warrants will be payable, less tax, on November 1, at the company's offices, 16, Eastcheap, London, E.C.3. Half-yearly coupon No. 47 of the preference share warrants to bearer will be payable on November 1, less tax at 5s. in the £, at the company's offices. The transfer books will be closed from October 16 to 31, both days inclusive.

NORTH BROKEN HILL, LTD.—The cabled report for the year ended June 30 states that ore treated amounted to 92,340 tons, while 18,200 tons lead concentrates were produced, and 17,880 tons zinc concentrates. The total to credit of profit and loss account is £80,073. Of this, administration expenses, insurance, debenture interest, etc., absorb £26,740, depreciation £10,000, and £13,333 is transferred to debenture sinking fund reserve, leaving a balance of £30,000. The surplus of liquid assets amounted to £452,654. For the previous year there was a loss on operations of £62,242, but with the receipts from concentrates produced in previous periods, the profit and loss showed a profit of £8,129. The directors have declared dividend No. 52 of 2s. per share, less Commonwealth of Australia absentee income tax at 8d. in the £ and British income tax, payable on December 6, to holders on the registers on October 17. The transfer books will close on October 16 and reopen on October 18. Shareholders are notified that 1s. of this dividend is out of profits for the year to June 30, 1922, and 1s. for the six months to December 31, 1922. The last previous dividend payment was 2s. per share in March, 1919.

Proposed Institute of Paint and Varnish Technologists

IN connection with the proposed inauguration of an Institute of Paint and Varnish Technologists, preliminary particulars of which were published in THE CHEMICAL AGE recently, it has been decided to hold a dinner at Frascati's Restaurant, Oxford Street, London, on Wednesday, October 11, at 7 p.m. Sir Ernest J. P. Benn, Bart. (chairman of Benn Brothers, Ltd.), has consented to preside. Tickets (10s. 6d. each, excluding wines) are obtainable from Mr H D. Bradford, hon. secretary of the Paint and Varnish Society, 42, Ribblesdale Road, Streatham, London, S.W.16.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OR FIRM OR AGENT.	MATERIAL.	REF. No.
Melbourne	Industrial Chemicals	356
Winterthur....	Chemicals for the paper, textile and tanning industries	—

Tariff Changes

SAN SALVADOR.—As from August 25, preparations for the purification of water, not specially mentioned in the present Customs tariff, are dutiable, on importation into the Republic at the rate of 2 centavos (gold) per kilog. As from August 24 perfumed and toilet soap is excluded from the list of articles subject to increased duty, and the import duty thereon is now at the reduced rate of 40 centavos (gold) per kilog.

CANADA.—Under a recent amendment of the Canadian Oleomargarine Act, 1919, the manufacture in, and the importation into, Canada of oleomargarine is permitted until August 31, 1923, and the sale of oleomargarine in Canada until March 1, 1924. All oleomargarine imported under the provisions of this Act may be imported free of duty. Under the oleomargarine regulations issued in connection with the Act, it is required, *inter alia*, that every person who imports oleomargarine into Canada must deliver to the Collector of Customs for each lot imported a certificate of inspection in the country of production. For oleomargarine manufactured in the United Kingdom, the Canadian authorities will accept a certificate signed by a Medical Officer of Health.

Failure of a Chemical Director

THE adjourned first meeting of creditors of Mr. John Robinson Hex, 12, Regent Square, London, W.C., company director, was held last week, before Mr. F. T. Garton, Official Receiver, at the London Bankruptcy Court. The debtor failed in August, and attributed his position to the holding up by the Registrar of Joint Stock Companies of certain trading certificates, thus preventing Shepperley's Manufacturing Chemists, Ltd., from carrying on business; also to loss of capital invested and money expended on behalf of the company. The chairman reported that the debtor had lodged a statement of affairs showing liabilities, £552; and assets valued at £2,520. He had also submitted a proposal for the payment of the debts in full by instalments, but there was no security provided for the payment of the money. The meeting was adjourned till October 19 to enable the proposal to be put in order.

Recent Wills

Mr. Thomas Devas Conway, of Beech Hurst, Byfleet, Surrey, a director of Stevenson and Howell, Ltd., manufacturing chemists, Southwark Street, London..... £6,470

Mr. Wentworth Varcoe, of Heath House, Alsager, Cheshire, a director of Varcoe's China Clays, Ltd., William Varcoe and Sons, Ltd., the Wheal Benalack China Clay Co., Ltd..... £10,590

Mr. Fred Bedford, Ph.D., B.Sc., of Eslaforde, Marden, Kent, and of Dovercourt, Heslington La., York, research chemist, left his shares and interest in Hydroil, Ltd., and a German company, and any other company formed or to be formed in connection with his discovery of a process for preparation of saturated fatty acids and their glycerides, in trust to pay £500 a year to his wife £19,660

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

COOPER, Tom, 6, Carlton Street, Scunthorpe, chemist. (C.C., 7/10/22.) £31 12s. 4d. September 1st.

DICKINSON, J. H., 68, Camden Street, North Shields, chemist. (C.C., 7/10/22.) £14 6s. 3d. August 17.

EDWARDS, J. M., 311, Fulham Palace Road, S.W., chemist (C.C., 7/10/22.) £22 14s. 1d. August 22.

FLOREY, Hartley, 45, Great Tower Street, E.C., chemists' merchant. (C.C., 7/10/22.) £41 1s. 3d. August 25.

HERMAN AND SWALLOW, Britannia Colour Works, Grimsby, colour and chemical merchants. (C.C., 7/10/22.) £24 18s. 6d. August 28.

LLEWELLYN, Mr. W., 135, Dunraven Street, Tonypandy, chemist. (C.C., 7/10/22.) £14 3s. 7d. August 17.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

AYRTON AND CO., LTD., Halifax, oil manufacturers. (M., 7/10/22.) Registered September 7, £5,000 (not ex.) charge, to Lloyds Bank, Ltd.; charged on land in Pellon Lane and Hall Street, Halifax. *Nil. January 3, 1922.

MAGADI SODA CO., LTD., London, E.C. (M., 7/10/22.) Registered September 21, £200,000 (not ex.) debenture, to Lloyds Bank, Ltd.; general charge. *£499,950. October 10, 1921.

Receivership

BUZZARD GLASS WORKS, LTD.—A. E. Johnson, of Premier House, 150, Southampton Row, W.C., was appointed receiver on September 15, under powers contained in instruments dated March 22 and May 8, 1922.

London Gazette

Company Winding up Voluntarily

BEDFORD CHEMICAL CO., LTD. (C.W.U.V., 7/10/22.) F. W. Wale, 6, St. Mary's Chambers, Bedford, appointed liquidator.

Bankruptcy Information

DE CESARI, Enea (lately of 9, Ampthill Square, Hampstead Road, London, N.W.1), manufacturer of vermin killer. (R.O., 7/10/22.) Receiving order, September 29. Creditor's petition. First meeting, October 13, 12.30 p.m., and public examination, December 20, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

LEVIN, Bertram, 16, Deansgate, Manchester, chemical manufacturer. Date of first meeting, October 11, 3 p.m., Official Receiver's offices, Byrom Street, Manchester. Public examination, October 27, 10 a.m., Court House' Quay Street, Manchester.

SHERMAN, B. (Male), 21, Sugar House Lane, Stratford, London, chemical manufacturer. (R.O., 7/10/22.) Receiving order, September 28. Creditor's petition. First meeting, October 12, 11 a.m., and public examination, December 12, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

Notice of Dividend

HALL, Howard Ephraim, 41, George Street, Luton, under the style of HALL AND SON, chemist and druggist. Amount per £, 1s. First and final. Payable October 10, offices of Keens, Shay, Keens and Co., 11, George Street West, Luton.

Company Winding Up

TYNE CHEMICAL PRODUCTS, LTD., 16A, Grainger Street, Newcastle-upon-Tyne. Last day for receiving proofs for dividend, October 13. Liquidator, J. C. Graham, jun., 16A, Grainger Street, Newcastle-upon-Tyne.

New Companies Registered

ASSOCIATED SUPPLY HOUSES, LTD., 3, London Wall Avenue, E.C. Manufacturing chemists, druggists, perfumers, drysalters, oil and colourmen; dealers in chemical, photographic, surgical and scientific apparatus and materials, etc. Nominal capital, £22,000 in £1 shares (2,000 10 per cent. cumulative preference and 20,000 ordinary).

BEDFORD CHEMICAL CO. (1922), LTD., St. Mary's Chambers, St. Mary's Street, Bedford. To take over the business of the Bedford Chemical Co., Ltd., carried on at the above address. Nominal capital, £5,000 in 3,000 ordinary and 2,000 preference shares of £1 each.

BIOZONE, LTD., 28, Bishopsgate, E.C.2. Manufacturers of chemical and other products, etc. Nominal capital £50,000 in £1 shares.

C. H. HANDASYDE AND CO., LTD., Abercorn Oil Works, Macfarlane Street, Paisley. Manufacturers of and dealers in oils and fats of all kinds, etc. Nominal capital, £20,000 in £1 shares.

DEVON AND CORNWALL PAINT CO., LTD., 1, Guildhall Chambers, High Street, Exeter. Objects as indicated by the title. Nominal capital, £10,000 in £1 shares.

GAZE AND GARSIDE, LTD., 92, Turner's Hill, Cheshunt, Wholesale or retail chemists and druggists, etc. Nominal capital, £2,000 in £1 shares.

GENERAL CHEMISTS' SUPPLIES, LTD., 13, Chapel Street, Salford, Lancs. Chemists, druggists, drysalters, oil and colourmen, etc. Nominal capital, £3,000 in £1 shares.

ITONA PRODUCTS, LTD. Manufacturers of and dealers in alimentary food products and beverages, extracts, essences and medicines. Nominal capital, £7,500 in £1 shares (6,000 ordinary and 1,500 7 per cent. cumulative preference). A subscriber: A. Burns, Redwood, Orrell Mount, near Wigan.

J. H. DENNIS, LTD., 33, Church Street, Howdon-on-Tyne. Pharmacy and drug store proprietors, chemists and druggists; dealers in chemical, optical and scientific apparatus and materials. Nominal capital, £400 in £1 shares.

JOHN SWAINE AND SON, LTD., 7, Clayton Lane, Bradford. Drysalters, paint and oil merchants; manufacturers of and dealers in cements, oils, paints, pigments, varnishes and dyewares, etc. Nominal capital, £10,000 in £1 shares.

KENYA EXTRACT SYNDICATE, LTD., 24, George Square, Glasgow. Chemical manufacturers, chemists, manufacturers of and dealers in tanning extracts, dyes, stains, varnishes, colours, etc. Nominal capital, £35,000 in £1 shares (15,000 preference and 20,000 ordinary).

LANCASHIRE PHOSPHATES, LTD., New Diversion Quay, The Docks, Preston. Manufacturers or sellers of fertilisers and general chemicals, etc. Nominal capital, £1,600 in £1 shares.

LOW AND HARE, LTD., 54 and 56, Fore Street, Hexham. Chemist and druggist. Nominal capital, £8,000 in £1 shares.

MORTIMER JAMES, "NO. 99" POWDER JOINTING CO., LTD., 57, King William Street, Greenwich. To acquire the business carried on by M. E. O. James, together with the right to manufacture and deal in certain cements and preparations known as "No. 99" Jointing Powder; manufacturers of and dealers in cements and other chemical preparations and drugs, etc. Nominal capital, £100 in £1 shares.